Mathematica 11.3 Integration Test Results

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

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

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

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

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

Result (type 3, 68 leaves):

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

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

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

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

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

Result (type 3, 69 leaves):

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

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

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

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

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

Result (type 3, 52 leaves):

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

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

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

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

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

Result (type 3, 44 leaves):

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

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

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

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

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

Result (type 3, 75 leaves):

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

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

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

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

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

Result (type 3, 75 leaves):

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

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

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

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

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

Result (type 3, 75 leaves):

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

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

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

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

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

Result (type 3, 75 leaves):

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

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

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

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

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

Result (type 3, 75 leaves):

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

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

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

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

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

Result (type 3, 78 leaves):

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

Problem 230: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 122 leaves):

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

Problem 232: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 109 leaves):

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

Problem 234: Result unnecessarily involves higher level functions.

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

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

$$\frac{1}{b}\sqrt{d\,\text{Csc}[a+b\,x]}\;\text{EllipticF}\left[a-\frac{\pi}{4}+b\,x,\,2\right]\sqrt{c\,\text{Sec}[a+b\,x]}\;\sqrt{\text{Sin}[2\,a+2\,b\,x]}$$

Result (type 5, 68 leaves):

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

Problem 235: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 69 leaves):

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

Problem 236: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 80 leaves):

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

Problem 237: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 87 leaves):

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

Problem 239: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 87 leaves):

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

Problem 241: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 66 leaves):

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

Problem 243: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 70 leaves):

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

Problem 244: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 86 leaves):

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

Problem 245: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 79 leaves):

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

Problem 246: Result unnecessarily involves higher level functions.

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

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

$$\frac{40 c d^5 (c \operatorname{Sec}[a+b x])^{3/2}}{21 b \sqrt{d \operatorname{Csc}[a+b x]}} - \frac{20 c d^3 (d \operatorname{Csc}[a+b x])^{3/2} (c \operatorname{Sec}[a+b x])^{3/2}}{21 b} - \frac{2 c d (d \operatorname{Csc}[a+b x])^{7/2} (c \operatorname{Sec}[a+b x])^{3/2}}{7 b} + \frac{1}{21 b} 40 c^2 d^4 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{EllipticF}\left[a - \frac{\pi}{4} + b x, 2\right] \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a + 2 b x]}$$

Result (type 5, 92 leaves):

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

Problem 248: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 87 leaves):

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

Problem 250: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 68 leaves):

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

Problem 252: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 70 leaves):

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

Problem 253: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 88 leaves):

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

Problem 255: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 79 leaves):

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

Problem 257: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 65 leaves):

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

Problem 258: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 66 leaves):

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

Problem 259: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 81 leaves):

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

Problem 260: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 82 leaves):

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

Problem 261: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 99 leaves):

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

Problem 263: Result unnecessarily involves higher level functions.

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

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

$$\frac{2 d^3 \left(d \operatorname{Csc}[a+b x]\right)^{3/2}}{21 b c \sqrt{c \operatorname{Sec}[a+b x]}}-\frac{2 d \left(d \operatorname{Csc}[a+b x]\right)^{7/2}}{7 b c \sqrt{c \operatorname{Sec}[a+b x]}}-\frac{1}{21 b c^2}$$
$$2 d^4 \sqrt{d \operatorname{Csc}[a+b x]} \operatorname{EllipticF}\left[a-\frac{\pi}{4}+b x, 2\right] \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}$$

Result (type 5, 119 leaves):

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

Problem 265: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 105 leaves):

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

Problem 266: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 95 leaves) :

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

Problem 267: Result unnecessarily involves higher level functions.

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

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

$$\frac{d}{b c \sqrt{d \operatorname{Csc}[a+b x]} \sqrt{c \operatorname{Sec}[a+b x]}}+\frac{1}{2 b c^2}\sqrt{d \operatorname{Csc}[a+b x]}\, \operatorname{EllipticF}\left[a-\frac{\pi}{4}+b x, 2\right] \sqrt{c \operatorname{Sec}[a+b x]} \sqrt{\operatorname{Sin}[2 a+2 b x]}$$

Result (type 5, 84 leaves) :

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

Problem 268: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 80 leaves):

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

Problem 269: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 89 leaves):

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

Problem 270: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 93 leaves):

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

Problem 272: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 82 leaves):

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

Problem 273: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 88 leaves):

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

Problem 274: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 79 leaves):

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

Problem 275: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 87 leaves):

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

Problem 276: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 91 leaves):

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

Problem 277: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 98 leaves):

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

Problem 278: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 91 leaves):

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

Problem 279: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 106 leaves):

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

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

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

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

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

Result (type 6, 2840 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 6, 2842 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+m\Bigg(-\frac{1}{\frac{5}{2}-\frac{n}{2}}(1-m-n)\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\Big[\frac{5}{2}-\frac{n}{2},1+m,2-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$
$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{\frac{5}{2}-\frac{n}{2}}(1+m)\left(\frac{3}{2}-\frac{n}{2}\right)\text{AppellF1}\Big[\frac{5}{2}-\frac{n}{2},2+m,1-m-n,\frac{7}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$
$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$
$$\Bigg((-1+n)\Bigg((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]-2\Bigg((-1+m+n)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},$$
$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2\Bigg)-$$
$$\Bigg(m\,(-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]$$
$$\text{Csc}[e+f x]^{-1+n}\left(\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)^m\left(\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\right)^{-1+m}$$
$$\Bigg(-\text{Cos}\left[\frac{1}{2}(e+f x)\right]\text{Sec}[e+f x]\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]+\text{Cos}\left[\frac{1}{2}(e+f x)\right]^2\text{Sec}[e+f x]\,\text{Tan}[e+f x]\Bigg)\Bigg)\Bigg/$$
$$\Bigg((-1+n)\Bigg((-3+n)\,\text{AppellF1}\Big[\frac{1}{2}-\frac{n}{2},m,1-m-n,\frac{3}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]-2\Bigg((-1+m+n)\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},m,2-m-n,\frac{5}{2}-\frac{n}{2},$$
$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},1+m,1-m-n,\frac{5}{2}-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Bigg)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)\Bigg)$$

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

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

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

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

Result (type 6, 2848 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$(-3+n)\ \Bigg(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\left(\frac{1}{2}-\frac{n}{2}\right)\text{AppellF1}\Big[\frac{3}{2}-\frac{n}{2},\ m,\ 2-m-n,\ \frac{5}{2}-\frac{n}{2},$$

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

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

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

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

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

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

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

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

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

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

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

Result (type 6, 2850 leaves):

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

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

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

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

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

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

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

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

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

$$(-3+n)\Big(-\frac{1}{\frac{3}{2}-\frac{n}{2}}(1-m-n)\left(\frac{1}{2}-\frac{n}{2}\right)\text{AppellF1}\left[\frac{3}{2}-\frac{n}{2}, m, 2-m-n, \frac{5}{2}-\frac{n}{2},\right.$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 5, 139 leaves):

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

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

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

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

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

Result (type 5, 192 leaves):

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

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

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

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

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

Result (type 5, 165 leaves):

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

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

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

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

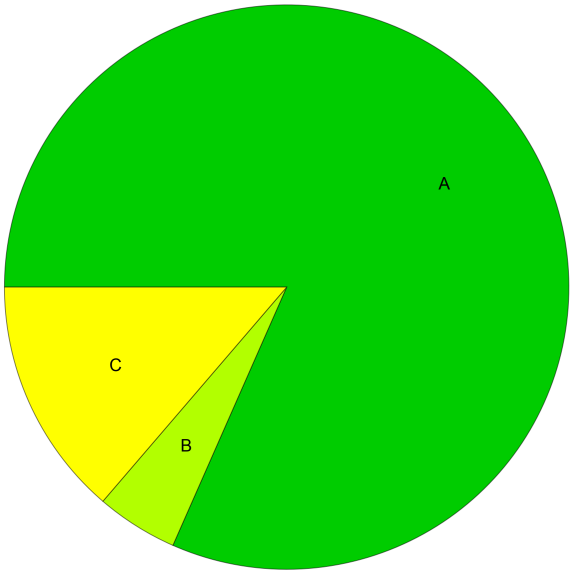
$$\left(b \, \text{Cos}[e+f x] \, (b \, \text{Csc}[e+f x])^{-1+n} \, \text{Hypergeometric2F1}\left[-\frac{3}{2}, \frac{1-n}{2}, \frac{3-n}{2}, \text{Sin}[e+f x]^2\right]\right) \Big/ \left(f \, (1-n) \, \sqrt{\text{Cos}[e+f x]^2}\right)$$

Result (type 5, 246 leaves):

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

Summary of Integration Test Results

299 integration problems



A - 244 optimal antiderivatives

B - 14 more than twice size of optimal antiderivatives

C - 41 unnecessarily complex antiderivatives

D - 0 unable to integrate problems

E - 0 integration timeouts