Mathematica 11.3 Integration Test Results

Test results for the 189 problems in "4.2.10 (c+d x)^m (a+b cos)^n.m"

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

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

Optimal (type 4, 75 leaves, 5 steps):

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

Result (type 4, 220 leaves):

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

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

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

Optimal (type 4, 114 leaves, 6 steps):

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

Result (type 4, 397 leaves):

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

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

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

Optimal (type 4, 82 leaves, 5 steps):

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

Result (type 4, 253 leaves):

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

Problem 38: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 193 leaves, 9 steps):

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

Result (type 4, 526 leaves):

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

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

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

Optimal (type 4, 117 leaves, 6 steps):

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

Result (type 4, 480 leaves):

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

Problem 55: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 247 leaves, 11 steps):

$$-\frac{16 b^2}{105 d^3 (c+d x)^{3/2}}-\frac{2\,\text{Cos}[a+b x]^2}{7 d (c+d x)^{7/2}}+\frac{32 b^2\,\text{Cos}[a+b x]^2}{105 d^3 (c+d x)^{3/2}}+$$
$$\frac{128 b^{7/2}\sqrt{\pi}\,\text{Cos}\left[2 a-\frac{2 b c}{d}\right]\text{FresnelC}\left[\frac{2\sqrt{b}\sqrt{c+d x}}{\sqrt{d}\sqrt{\pi}}\right]}{105 d^{9/2}}-$$
$$\frac{128 b^{7/2}\sqrt{\pi}\,\text{FresnelS}\left[\frac{2\sqrt{b}\sqrt{c+d x}}{\sqrt{d}\sqrt{\pi}}\right]\text{Sin}\left[2 a-\frac{2 b c}{d}\right]}{105 d^{9/2}}+$$
$$\frac{8 b\,\text{Cos}[a+b x]\,\text{Sin}[a+b x]}{35 d^2 (c+d x)^{5/2}}-\frac{128 b^3\,\text{Cos}[a+b x]\,\text{Sin}[a+b x]}{105 d^4\sqrt{c+d x}}$$

Result (type 4, 987 leaves):

$$-\frac{1}{7 d (c+d x)^{7/2}}+\frac{1}{2}\left(\text{Cos}[2 a]\left(-\frac{1}{7 d}32\sqrt{2}\left(\frac{b}{d}\right)^{7/2}\text{Cos}\left[\frac{b c}{d}\right]\text{Sin}\left[\frac{b c}{d}\right]\right.\right.$$

$$\left(\frac{\text{Sin}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{8\sqrt{2}\left(\frac{b}{d}\right)^{7/2}(c+d\,x)^{7/2}}+\frac{2}{5}\left(\frac{\text{Cos}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{4\sqrt{2}\left(\frac{b}{d}\right)^{5/2}(c+d\,x)^{5/2}}-\frac{2}{3}\left(2\left(\frac{\text{Cos}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{\sqrt{2}\sqrt{\frac{b}{d}}\sqrt{c+d\,x}}+\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\sqrt{2\,\pi}\;\text{FresnelS}\left[\frac{2\sqrt{\frac{b}{d}}\sqrt{c+d\,x}}{\sqrt{\pi}}\right]\right)+\frac{\text{Sin}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{2\sqrt{2}\left(\frac{b}{d}\right)^{3/2}(c+d\,x)^{3/2}}\right)\right)\right)-$$

$$\frac{1}{7\,d}16\sqrt{2}\left(\frac{b}{d}\right)^{7/2}\text{Cos}\left[\frac{2\,b\,c}{d}\right]\left(\frac{\text{Cos}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{8\sqrt{2}\left(\frac{b}{d}\right)^{7/2}(c+d\,x)^{7/2}}-\right.$$

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

$$\left.\left.\left.2\left(-\sqrt{2\,\pi}\;\text{FresnelC}\left[\frac{2\sqrt{\frac{b}{d}}\sqrt{c+d\,x}}{\sqrt{\pi}}\right]+\frac{\text{Sin}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{\sqrt{2}\sqrt{\frac{b}{d}}\sqrt{c+d\,x}}\right)\right)\right)\right)\right)-$$

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

$$\left(\frac{\text{Sin}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{8\sqrt{2}\left(\frac{b}{d}\right)^{7/2}(c+d\,x)^{7/2}}+\frac{2}{5}\left(\frac{\text{Cos}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{4\sqrt{2}\left(\frac{b}{d}\right)^{5/2}(c+d\,x)^{5/2}}-\frac{2}{3}\left(2\left(\frac{\text{Cos}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{\sqrt{2}\sqrt{\frac{b}{d}}\sqrt{c+d\,x}}+\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\sqrt{2\,\pi}\;\text{FresnelS}\left[\frac{2\sqrt{\frac{b}{d}}\sqrt{c+d\,x}}{\sqrt{\pi}}\right]\right)+\frac{\text{Sin}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{2\sqrt{2}\left(\frac{b}{d}\right)^{3/2}(c+d\,x)^{3/2}}\right)\right)\right)+$$

$$\frac{1}{7 d}16 \sqrt{2} \left(\frac{b}{d}\right)^{7/2} \text{Sin}\left[\frac{2 b c}{d}\right] \left(\frac{\text{Cos}\left[\frac{2 b (c+d x)}{d}\right]}{8 \sqrt{2} \left(\frac{b}{d}\right)^{7/2} (c+d x)^{7/2}} -\right.$$

$$\frac{2}{5}\left(\frac{\text{Sin}\left[\frac{2 b (c+d x)}{d}\right]}{4 \sqrt{2} \left(\frac{b}{d}\right)^{5/2} (c+d x)^{5/2}} + \frac{2}{3}\left(\frac{\text{Cos}\left[\frac{2 b (c+d x)}{d}\right]}{2 \sqrt{2} \left(\frac{b}{d}\right)^{3/2} (c+d x)^{3/2}} -\right.\right.$$

$$\left.\left.\left. 2 \left(-\sqrt{2 \pi}\, \text{FresnelC}\left[\frac{2 \sqrt{\frac{b}{d}} \sqrt{c+d x}}{\sqrt{\pi}}\right] + \frac{\text{Sin}\left[\frac{2 b (c+d x)}{d}\right]}{\sqrt{2} \sqrt{\frac{b}{d}} \sqrt{c+d x}}\right)\right)\right)\right)$$

Problem 62: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cos}[a+b x]^3}{(c+d x)^{7/2}} \, dx$$

Optimal (type 4, 356 leaves, 19 steps):

$$-\frac{16 b^2 \text{Cos}[a+b x]}{5 d^3 \sqrt{c+d x}} - \frac{2 \text{Cos}[a+b x]^3}{5 d (c+d x)^{5/2}} + \frac{24 b^2 \text{Cos}[a+b x]^3}{5 d^3 \sqrt{c+d x}} +$$

$$\frac{2 b^{5/2} \sqrt{2 \pi}\, \text{Cos}\left[a-\frac{b c}{d}\right] \text{FresnelS}\left[\frac{\sqrt{b} \sqrt{\frac{2}{\pi}} \sqrt{c+d x}}{\sqrt{d}}\right]}{5 d^{7/2}} +$$

$$\frac{6 b^{5/2} \sqrt{6 \pi}\, \text{Cos}\left[3 a-\frac{3 b c}{d}\right] \text{FresnelS}\left[\frac{\sqrt{b} \sqrt{\frac{6}{\pi}} \sqrt{c+d x}}{\sqrt{d}}\right]}{5 d^{7/2}} +$$

$$\frac{6 b^{5/2} \sqrt{6 \pi}\, \text{FresnelC}\left[\frac{\sqrt{b} \sqrt{\frac{6}{\pi}} \sqrt{c+d x}}{\sqrt{d}}\right] \text{Sin}\left[3 a-\frac{3 b c}{d}\right]}{5 d^{7/2}} +$$

$$\frac{2 b^{5/2} \sqrt{2 \pi}\, \text{FresnelC}\left[\frac{\sqrt{b} \sqrt{\frac{2}{\pi}} \sqrt{c+d x}}{\sqrt{d}}\right] \text{Sin}\left[a-\frac{b c}{d}\right]}{5 d^{7/2}} + \frac{4 b \text{Cos}[a+b x]^2 \text{Sin}[a+b x]}{5 d^2 (c+d x)^{3/2}}$$

Result (type 4, 1429 leaves):

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

$$\left.\left.\frac{2}{3}\left(2\left(\frac{\text{Cos}\left[\frac{b\,(c+d\,x)}{d}\right]}{\sqrt{\frac{b}{d}}\,\sqrt{c+d\,x}}+\sqrt{2\,\pi}\,\text{FresnelS}\left[\sqrt{\frac{b}{d}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{c+d\,x}\right]\right)+\frac{\text{Sin}\left[\frac{b\,(c+d\,x)}{d}\right]}{\left(\frac{b}{d}\right)^{3/2}(c+d\,x)^{3/2}}\right)\right)-$$

$$\frac{1}{5\,d}2\left(\frac{b}{d}\right)^{5/2}\text{Cos}\left[\frac{b\,c}{d}\right]\left(\frac{\text{Sin}\left[\frac{b\,(c+d\,x)}{d}\right]}{\left(\frac{b}{d}\right)^{5/2}(c+d\,x)^{5/2}}+\right.$$

$$\left.\left.\left.\frac{2}{3}\left(\frac{\text{Cos}\left[\frac{b\,(c+d\,x)}{d}\right]}{\left(\frac{b}{d}\right)^{3/2}(c+d\,x)^{3/2}}-2\left(-\sqrt{2\,\pi}\,\text{FresnelC}\left[\sqrt{\frac{b}{d}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{c+d\,x}\right]+\frac{\text{Sin}\left[\frac{b\,(c+d\,x)}{d}\right]}{\sqrt{\frac{b}{d}}\,\sqrt{c+d\,x}}\right)\right)\right)\right)+$$

$$\text{Cos}[a]\left(-\frac{1}{5\,d}2\left(\frac{b}{d}\right)^{5/2}\text{Cos}\left[\frac{b\,c}{d}\right]\left(\frac{\text{Cos}\left[\frac{b\,(c+d\,x)}{d}\right]}{\left(\frac{b}{d}\right)^{5/2}(c+d\,x)^{5/2}}-\right.\right.$$

$$\left.\frac{2}{3}\left(2\left(\frac{\text{Cos}\left[\frac{b\,(c+d\,x)}{d}\right]}{\sqrt{\frac{b}{d}}\,\sqrt{c+d\,x}}+\sqrt{2\,\pi}\,\text{FresnelS}\left[\sqrt{\frac{b}{d}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{c+d\,x}\right]\right)+\frac{\text{Sin}\left[\frac{b\,(c+d\,x)}{d}\right]}{\left(\frac{b}{d}\right)^{3/2}(c+d\,x)^{3/2}}\right)\right)-$$

$$\frac{1}{5\,d}2\left(\frac{b}{d}\right)^{5/2}\text{Sin}\left[\frac{b\,c}{d}\right]\left(\frac{\text{Sin}\left[\frac{b\,(c+d\,x)}{d}\right]}{\left(\frac{b}{d}\right)^{5/2}(c+d\,x)^{5/2}}+\frac{2}{3}\left(\frac{\text{Cos}\left[\frac{b\,(c+d\,x)}{d}\right]}{\left(\frac{b}{d}\right)^{3/2}(c+d\,x)^{3/2}}-\right.\right.$$

$$\left.\left.\left.\left.2\left(-\sqrt{2\,\pi}\,\text{FresnelC}\left[\sqrt{\frac{b}{d}}\,\sqrt{\frac{2}{\pi}}\,\sqrt{c+d\,x}\right]+\frac{\text{Sin}\left[\frac{b\,(c+d\,x)}{d}\right]}{\sqrt{\frac{b}{d}}\,\sqrt{c+d\,x}}\right)\right)\right)\right)\right)+$$

$$\frac{1}{4}\Bigg(-\text{Sin}[3\,a]\Bigg(\frac{1}{5\,d}18\,\sqrt{3}\,\left(\frac{b}{d}\right)^{5/2}\text{Sin}\left[\frac{3\,b\,c}{d}\right]\Bigg(\frac{\text{Cos}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{9\,\sqrt{3}\,\left(\frac{b}{d}\right)^{5/2}\,(c+d\,x)^{5/2}}-\frac{2}{3}\Bigg(2\Bigg(\frac{\text{Cos}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{\sqrt{3}\,\sqrt{\frac{b}{d}}\,\sqrt{c+d\,x}}+$$

$$\sqrt{2\,\pi}\,\text{FresnelS}\left[\sqrt{\frac{b}{d}}\,\sqrt{\frac{6}{\pi}}\,\sqrt{c+d\,x}\right]\Bigg)+\frac{\text{Sin}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{3\,\sqrt{3}\,\left(\frac{b}{d}\right)^{3/2}\,(c+d\,x)^{3/2}}\Bigg)\Bigg)-\frac{1}{5\,d}$$

$$18\,\sqrt{3}\,\left(\frac{b}{d}\right)^{5/2}\text{Cos}\left[\frac{3\,b\,c}{d}\right]\Bigg(\frac{\text{Sin}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{9\,\sqrt{3}\,\left(\frac{b}{d}\right)^{5/2}\,(c+d\,x)^{5/2}}+\frac{2}{3}\Bigg(\frac{\text{Cos}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{3\,\sqrt{3}\,\left(\frac{b}{d}\right)^{3/2}\,(c+d\,x)^{3/2}}-$$

$$2\Bigg(-\sqrt{2\,\pi}\,\text{FresnelC}\left[\sqrt{\frac{b}{d}}\,\sqrt{\frac{6}{\pi}}\,\sqrt{c+d\,x}\right]+\frac{\text{Sin}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{\sqrt{3}\,\sqrt{\frac{b}{d}}\,\sqrt{c+d\,x}}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$\text{Cos}[3\,a]\Bigg(-\frac{1}{5\,d}18\,\sqrt{3}\,\left(\frac{b}{d}\right)^{5/2}\text{Cos}\left[\frac{3\,b\,c}{d}\right]\Bigg(\frac{\text{Cos}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{9\,\sqrt{3}\,\left(\frac{b}{d}\right)^{5/2}\,(c+d\,x)^{5/2}}-\frac{2}{3}\Bigg(2\Bigg(\frac{\text{Cos}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{\sqrt{3}\,\sqrt{\frac{b}{d}}\,\sqrt{c+d\,x}}+$$

$$\sqrt{2\,\pi}\,\text{FresnelS}\left[\sqrt{\frac{b}{d}}\,\sqrt{\frac{6}{\pi}}\,\sqrt{c+d\,x}\right]\Bigg)+\frac{\text{Sin}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{3\,\sqrt{3}\,\left(\frac{b}{d}\right)^{3/2}\,(c+d\,x)^{3/2}}\Bigg)\Bigg)-\frac{1}{5\,d}$$

$$18\,\sqrt{3}\,\left(\frac{b}{d}\right)^{5/2}\text{Sin}\left[\frac{3\,b\,c}{d}\right]\Bigg(\frac{\text{Sin}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{9\,\sqrt{3}\,\left(\frac{b}{d}\right)^{5/2}\,(c+d\,x)^{5/2}}+\frac{2}{3}\Bigg(\frac{\text{Cos}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{3\,\sqrt{3}\,\left(\frac{b}{d}\right)^{3/2}\,(c+d\,x)^{3/2}}-$$

$$2\Bigg(-\sqrt{2\,\pi}\,\text{FresnelC}\left[\sqrt{\frac{b}{d}}\,\sqrt{\frac{6}{\pi}}\,\sqrt{c+d\,x}\right]+\frac{\text{Sin}\left[\frac{3\,b\,(c+d\,x)}{d}\right]}{\sqrt{3}\,\sqrt{\frac{b}{d}}\,\sqrt{c+d\,x}}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)$$

Problem 75: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 15 leaves, 0 steps):

$$\text{Int}\left[x\sqrt{\text{Cos}[a+b\,x]},\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 86: Attempted integration timed out after 120 seconds.

$$\int \frac{x}{\text{Cos}[a+b\,x]^{3/2}}\,dx$$

Optimal (type 8, 55 leaves, 1 step):

$$\frac{4\sqrt{\text{Cos}[a+b\,x]}}{b^2}+\frac{2\,x\,\text{Sin}[a+b\,x]}{b\sqrt{\text{Cos}[a+b\,x]}}-\text{Int}\left[x\sqrt{\text{Cos}[a+b\,x]},\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 129: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 101 leaves, 6 steps):

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

Result (type 4, 454 leaves):

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

$$\left(8\,d^2\,\mathrm{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^2\mathrm{Csc}\left[\frac{e}{2}\right]\left(\frac{1}{4}e^{-i\,\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]}f^2x^2-\frac{1}{\sqrt{1+\mathrm{Cot}\left[\frac{e}{2}\right]^2}}\right.\right.$$
$$\mathrm{Cot}\left[\frac{e}{2}\right]\left(\frac{1}{2}i\,f\,x\left(-\pi-2\,\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right)-\pi\,\mathrm{Log}\left[1+e^{-i\,f\,x}\right]-2\left(\frac{f\,x}{2}-\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right)\right.$$
$$\mathrm{Log}\left[1-e^{2\,i\left(\frac{f\,x}{2}-\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]+\pi\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{f\,x}{2}\right]\right]-2\,\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]$$
$$\left.\left.\left.\mathrm{Log}\left[\mathrm{Sin}\left[\frac{f\,x}{2}-\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right]\right]+i\,\mathrm{PolyLog}\left[2,e^{2\,i\left(\frac{f\,x}{2}-\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]\right)\right)\mathrm{Sec}\left[\frac{e}{2}\right]\right)\Big/$$
$$\left(f^3\left(a+a\,\mathrm{Cos}[e+f\,x]\right)\sqrt{\mathrm{Csc}\left[\frac{e}{2}\right]^2\left(\mathrm{Cos}\left[\frac{e}{2}\right]^2+\mathrm{Sin}\left[\frac{e}{2}\right]^2\right)}\right)+$$
$$\frac{2\,\mathrm{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\mathrm{Sec}\left[\frac{e}{2}\right]\left(c^2\,\mathrm{Sin}\left[\frac{f\,x}{2}\right]+2\,c\,d\,x\,\mathrm{Sin}\left[\frac{f\,x}{2}\right]+d^2x^2\,\mathrm{Sin}\left[\frac{f\,x}{2}\right]\right)}{f\left(a+a\,\mathrm{Cos}[e+f\,x]\right)}$$

Problem 133: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 271 leaves, 10 steps):

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

Result (type 4, 1016 leaves):

$$-\left(\left(\left(4\,d^3\,e^{-\frac{i\,e}{2}}\,\mathrm{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\left(i\,f^2x^2\left(e^{i\,e}f\,x+3\,i\left(1+e^{i\,e}\right)\mathrm{Log}\left[1+e^{i\,(e+f\,x)}\right]\right)+\right.\right.\right.\right.$$
$$\left.\left.6\,i\left(1+e^{i\,e}\right)f\,x\,\mathrm{PolyLog}\left[2,-e^{i\,(e+f\,x)}\right]-6\left(1+e^{i\,e}\right)\mathrm{PolyLog}\left[3,-e^{i\,(e+f\,x)}\right]\right)\mathrm{Sec}\left[\frac{e}{2}\right]\right)\Big/$$
$$\left(3\,f^4\left(a+a\,\mathrm{Cos}[e+f\,x]\right)^2\right)\right)+\left(16\,d^3\,\mathrm{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\mathrm{Sec}\left[\frac{e}{2}\right]\right.$$

$$\left(\mathrm{Cos}\left[\frac{e}{2}\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{e}{2}\right]\mathrm{Cos}\left[\frac{f x}{2}\right]-\mathrm{Sin}\left[\frac{e}{2}\right]\mathrm{Sin}\left[\frac{f x}{2}\right]\right]+\frac{1}{2} f x\,\mathrm{Sin}\left[\frac{e}{2}\right]\right)\Big)\Big/$$
$$\left(f^4\left(a+a\,\mathrm{Cos}[e+f x]\right)^2\left(\mathrm{Cos}\left[\frac{e}{2}\right]^2+\mathrm{Sin}\left[\frac{e}{2}\right]^2\right)\right)+$$
$$\Big(8 c^2 d\,\mathrm{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\mathrm{Sec}\left[\frac{e}{2}\right]$$
$$\left(\mathrm{Cos}\left[\frac{e}{2}\right]\mathrm{Log}\left[\mathrm{Cos}\left[\frac{e}{2}\right]\mathrm{Cos}\left[\frac{f x}{2}\right]-\mathrm{Sin}\left[\frac{e}{2}\right]\mathrm{Sin}\left[\frac{f x}{2}\right]\right]+\frac{1}{2} f x\,\mathrm{Sin}\left[\frac{e}{2}\right]\right)\Big)\Big/$$
$$\left(f^2\left(a+a\,\mathrm{Cos}[e+f x]\right)^2\left(\mathrm{Cos}\left[\frac{e}{2}\right]^2+\mathrm{Sin}\left[\frac{e}{2}\right]^2\right)\right)+$$
$$\Bigg(16 c d^2\,\mathrm{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]^4\mathrm{Csc}\left[\frac{e}{2}\right]\Bigg(\frac{1}{4}e^{-i\,\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]} f^2 x^2-\frac{1}{\sqrt{1+\mathrm{Cot}\left[\frac{e}{2}\right]^2}}$$
$$\mathrm{Cot}\left[\frac{e}{2}\right]\left(\frac{1}{2} i f x\left(-\pi-2\,\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right)-\pi\,\mathrm{Log}\left[1+e^{-i f x}\right]-2\left(\frac{f x}{2}-\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right)\right.$$
$$\mathrm{Log}\left[1-e^{2 i\left(\frac{f x}{2}-\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]+\pi\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{f x}{2}\right]\right]-2\,\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]$$
$$\left.\mathrm{Log}\left[\mathrm{Sin}\left[\frac{f x}{2}-\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right]\right]+i\,\mathrm{PolyLog}\left[2, e^{2 i\left(\frac{f x}{2}-\mathrm{ArcTan}\left[\mathrm{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]\right)\Bigg)\mathrm{Sec}\left[\frac{e}{2}\right]\Bigg)\Big/$$
$$\left(f^3\left(a+a\,\mathrm{Cos}[e+f x]\right)^2\sqrt{\mathrm{Csc}\left[\frac{e}{2}\right]^2\left(\mathrm{Cos}\left[\frac{e}{2}\right]^2+\mathrm{Sin}\left[\frac{e}{2}\right]^2\right)}\right)+$$
$$\frac{1}{3 f^3\left(a+a\,\mathrm{Cos}[e+f x]\right)^2}$$
$$\mathrm{Cos}\left[\frac{e}{2}+\frac{f x}{2}\right]\mathrm{Sec}\left[\frac{e}{2}\right]$$
$$\left(-3 c^2 d f\,\mathrm{Cos}\left[\frac{f x}{2}\right]-6 c d^2 f x\,\mathrm{Cos}\left[\frac{f x}{2}\right]-3 d^3 f x^2\,\mathrm{Cos}\left[\frac{f x}{2}\right]-\right.$$
$$3 c^2 d f\,\mathrm{Cos}\left[e+\frac{f x}{2}\right]-6 c d^2 f x\,\mathrm{Cos}\left[e+\frac{f x}{2}\right]-3 d^3 f x^2\,\mathrm{Cos}\left[e+\frac{f x}{2}\right]+$$
$$12 c d^2\,\mathrm{Sin}\left[\frac{f x}{2}\right]+3 c^3 f^2\,\mathrm{Sin}\left[\frac{f x}{2}\right]+12 d^3 x\,\mathrm{Sin}\left[\frac{f x}{2}\right]+9 c^2 d f^2 x\,\mathrm{Sin}\left[\frac{f x}{2}\right]+$$
$$9 c d^2 f^2 x^2\,\mathrm{Sin}\left[\frac{f x}{2}\right]+3 d^3 f^2 x^3\,\mathrm{Sin}\left[\frac{f x}{2}\right]-6 c d^2\,\mathrm{Sin}\left[e+\frac{f x}{2}\right]-6 d^3 x\,\mathrm{Sin}\left[e+\frac{f x}{2}\right]+$$
$$6 c d^2\,\mathrm{Sin}\left[e+\frac{3 f x}{2}\right]+c^3 f^2\,\mathrm{Sin}\left[e+\frac{3 f x}{2}\right]+6 d^3 x\,\mathrm{Sin}\left[e+\frac{3 f x}{2}\right]+$$
$$\left.3 c^2 d f^2 x\,\mathrm{Sin}\left[e+\frac{3 f x}{2}\right]+3 c d^2 f^2 x^2\,\mathrm{Sin}\left[e+\frac{3 f x}{2}\right]+d^3 f^2 x^3\,\mathrm{Sin}\left[e+\frac{3 f x}{2}\right]\right)$$

Problem 134: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 212 leaves, 9 steps):

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

Result (type 4, 619 leaves):

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

$$\left(16\,d^2\,\text{Cos}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^4\,\text{Csc}\left[\frac{e}{2}\right]\left(\frac{1}{4}\,e^{-i\,\text{ArcTan}\left[\text{Cot}\left[\frac{e}{2}\right]\right]}\,f^2\,x^2-\frac{1}{\sqrt{1+\text{Cot}\left[\frac{e}{2}\right]^2}}\right.\right.$$
$$\text{Cot}\left[\frac{e}{2}\right]\left(\frac{1}{2}\,i\,f\,x\left(-\pi-2\,\text{ArcTan}\left[\text{Cot}\left[\frac{e}{2}\right]\right]\right)-\pi\,\text{Log}\left[1+e^{-i\,f\,x}\right]-2\left(\frac{f\,x}{2}-\text{ArcTan}\left[\text{Cot}\left[\frac{e}{2}\right]\right]\right)\right.$$
$$\text{Log}\left[1-e^{2\,i\left(\frac{f\,x}{2}-\text{ArcTan}\left[\text{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]+\pi\,\text{Log}\left[\text{Cos}\left[\frac{f\,x}{2}\right]\right]-2\,\text{ArcTan}\left[\text{Cot}\left[\frac{e}{2}\right]\right]$$
$$\left.\left.\left.\text{Log}\left[\text{Sin}\left[\frac{f\,x}{2}-\text{ArcTan}\left[\text{Cot}\left[\frac{e}{2}\right]\right]\right]\right]+i\,\text{PolyLog}\left[2,e^{2\,i\left(\frac{f\,x}{2}-\text{ArcTan}\left[\text{Cot}\left[\frac{e}{2}\right]\right]\right)}\right]\right)\right)\text{Sec}\left[\frac{e}{2}\right]\right)\Big/$$
$$\left(3\,f^3\,(a+a\,\text{Cos}[e+f\,x])^2\,\sqrt{\text{Csc}\left[\frac{e}{2}\right]^2\left(\text{Cos}\left[\frac{e}{2}\right]^2+\text{Sin}\left[\frac{e}{2}\right]^2\right)}\right)+$$

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

Problem 139: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 102 leaves, 6 steps):

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

Result (type 4, 447 leaves):

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

Problem 172: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 156 leaves, 6 steps):

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

Result (type 4, 333 leaves):

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

Problem 180: Result more than twice size of optimal antiderivative.

$$\int\frac{x^3}{(a+a\,\text{Cos}[x])^{3/2}}\,dx$$

Optimal (type 4, 423 leaves, 16 steps):

$$-\frac{3 x^2}{a \sqrt{a+a \operatorname{Cos}[x]}}-\frac{24 i x \operatorname{ArcTan}\left[e^{\frac{i x}{2}}\right] \operatorname{Cos}\left[\frac{x}{2}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}-\frac{i x^3 \operatorname{ArcTan}\left[e^{\frac{i x}{2}}\right] \operatorname{Cos}\left[\frac{x}{2}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}+\frac{24 i \operatorname{Cos}\left[\frac{x}{2}\right] \operatorname{PolyLog}\left[2,-i e^{\frac{i x}{2}}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}+\frac{3 i x^2 \operatorname{Cos}\left[\frac{x}{2}\right] \operatorname{PolyLog}\left[2,-i e^{\frac{i x}{2}}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}-\frac{24 i \operatorname{Cos}\left[\frac{x}{2}\right] \operatorname{PolyLog}\left[2, i e^{\frac{i x}{2}}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}-\frac{3 i x^2 \operatorname{Cos}\left[\frac{x}{2}\right] \operatorname{PolyLog}\left[2, i e^{\frac{i x}{2}}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}-\frac{12 x \operatorname{Cos}\left[\frac{x}{2}\right] \operatorname{PolyLog}\left[3,-i e^{\frac{i x}{2}}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}+\frac{12 x \operatorname{Cos}\left[\frac{x}{2}\right] \operatorname{PolyLog}\left[3, i e^{\frac{i x}{2}}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}-\frac{24 i \operatorname{Cos}\left[\frac{x}{2}\right] \operatorname{PolyLog}\left[4,-i e^{\frac{i x}{2}}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}+\frac{24 i \operatorname{Cos}\left[\frac{x}{2}\right] \operatorname{PolyLog}\left[4, i e^{\frac{i x}{2}}\right]}{a \sqrt{a+a \operatorname{Cos}[x]}}+\frac{x^3 \operatorname{Tan}\left[\frac{x}{2}\right]}{2 a \sqrt{a+a \operatorname{Cos}[x]}}$$

Result (type 4, 1391 leaves):

$$-\frac{6 x^2 \operatorname{Cos}\left[\frac{x}{2}\right]^3}{(a(1+\operatorname{Cos}[x]))^{3/2}}+\left(48 \operatorname{Cos}\left[\frac{x}{2}\right]^3\left(\frac{1}{2} x\left(\operatorname{Log}\left[1-i e^{\frac{i x}{2}}\right]-\operatorname{Log}\left[1+i e^{\frac{i x}{2}}\right]\right)+i\left(\operatorname{PolyLog}\left[2,-i e^{\frac{i x}{2}}\right]-\operatorname{PolyLog}\left[2, i e^{\frac{i x}{2}}\right]\right)\right)\right) \Big/ (a(1+\operatorname{Cos}[x]))^{3/2}+\frac{1}{(a(1+\operatorname{Cos}[x]))^{3/2}}$$

$$8 \operatorname{Cos}\left[\frac{x}{2}\right]^3\left(\frac{1}{8} \pi^3 \operatorname{Log}\left[\operatorname{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\frac{x}{2}\right)\right]\right]+\frac{3}{4} \pi^2\left(\left(\frac{\pi}{2}-\frac{x}{2}\right)\left(\operatorname{Log}\left[1-e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]-\operatorname{Log}\left[1+e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]\right)+\right.\right.$$
$$\left.i\left(\operatorname{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]-\operatorname{PolyLog}\left[2, e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]\right)\right)-$$
$$\frac{3}{2} \pi\left(\left(\frac{\pi}{2}-\frac{x}{2}\right)^2\left(\operatorname{Log}\left[1-e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]-\operatorname{Log}\left[1+e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]\right)+\right.$$
$$2 i\left(\frac{\pi}{2}-\frac{x}{2}\right)\left(\operatorname{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]-\operatorname{PolyLog}\left[2, e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]\right)+$$
$$\left.2\left(-\operatorname{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]+\operatorname{PolyLog}\left[3, e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]\right)\right)+8\left(\frac{1}{4} i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)^4+\right.$$
$$\frac{1}{64} i\left(\frac{\pi}{2}-\frac{x}{2}\right)^4-\frac{1}{8} \pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)-\operatorname{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right]\right)-$$
$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)^3 \operatorname{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right]-\frac{1}{8}\left(\frac{\pi}{2}-\frac{x}{2}\right)^3 \operatorname{Log}\left[1+e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]+$$
$$\frac{3}{4} \pi^2\left(\frac{1}{2} i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right) \operatorname{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right]+\right.$$
$$\left.\frac{1}{2} i \operatorname{PolyLog}\left[2,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right]\right)+\frac{3}{2} i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)^2$$
$$\operatorname{PolyLog}\left[2,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right]+\frac{3}{8} i\left(\frac{\pi}{2}-\frac{x}{2}\right)^2 \operatorname{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]-$$
$$\frac{3}{2} \pi\left(\frac{1}{3} i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)^2 \operatorname{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right]+\right.$$

$$i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right) \text{PolyLog}\left[2, -e^{2 i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right] - \frac{1}{2}\text{PolyLog}\left[3, -e^{2 i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right]\right) -$$
$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right) \text{PolyLog}\left[3, -e^{2 i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right] - \frac{3}{4}\left(\frac{\pi}{2}-\frac{x}{2}\right) \text{PolyLog}\left[3, -e^{i \left(\frac{\pi}{2}-\frac{x}{2}\right)}\right] -$$
$$\frac{3}{4} i\, \text{PolyLog}\left[4, -e^{2 i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\frac{x}{2}\right)\right)}\right] - \frac{3}{4} i\, \text{PolyLog}\left[4, -e^{i \left(\frac{\pi}{2}-\frac{x}{2}\right)}\right]\right)\Bigg) +$$
$$\frac{x^3 \text{Cos}\left[\frac{x}{2}\right]^3}{2 \left(a \left(1+\text{Cos}[x]\right)\right)^{3/2} \left(\text{Cos}\left[\frac{x}{4}\right]-\text{Sin}\left[\frac{x}{4}\right]\right)^2} - \frac{6 x^2 \text{Cos}\left[\frac{x}{2}\right]^3 \text{Sin}\left[\frac{x}{4}\right]}{\left(a \left(1+\text{Cos}[x]\right)\right)^{3/2} \left(\text{Cos}\left[\frac{x}{4}\right]-\text{Sin}\left[\frac{x}{4}\right]\right)} -$$
$$\frac{x^3 \text{Cos}\left[\frac{x}{2}\right]^3}{2 \left(a \left(1+\text{Cos}[x]\right)\right)^{3/2} \left(\text{Cos}\left[\frac{x}{4}\right]+\text{Sin}\left[\frac{x}{4}\right]\right)^2} + \frac{6 x^2 \text{Cos}\left[\frac{x}{2}\right]^3 \text{Sin}\left[\frac{x}{4}\right]}{\left(a \left(1+\text{Cos}[x]\right)\right)^{3/2} \left(\text{Cos}\left[\frac{x}{4}\right]+\text{Sin}\left[\frac{x}{4}\right]\right)}$$

Problem 187: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 214 leaves, 8 steps):

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

Result (type 4, 756 leaves):

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

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

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

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

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

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

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

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

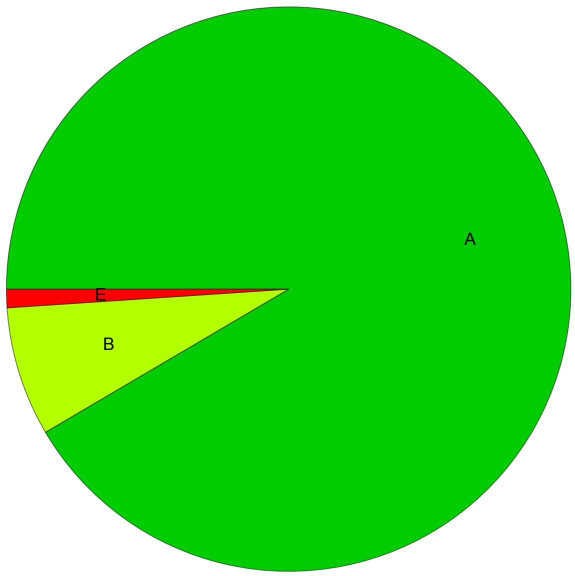
$$\text{Log}\left[\frac{(a+b)\left(i\,a-i\,b+\sqrt{-a^2+b^2}\right)\left(i+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{b\left(a+b+\sqrt{-a^2+b^2}\ \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right]+$$

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

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

Summary of Integration Test Results

189 integration problems



A - 173 optimal antiderivatives

B - 14 more than twice size of optimal antiderivatives

C - 0 unnecessarily complex antiderivatives

D - 0 unable to integrate problems

E - 2 integration timeouts