Mathematica 11.3 Integration Test Results

Test results for the 183 problems in "6.2.1 (c+d x)^m (a+b cosh)^n.m"

Problem 28: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 61 leaves, 5 steps):

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

Result (type 4, 132 leaves):

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

Problem 32: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 73 leaves, 5 steps):

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

Result (type 4, 277 leaves):

$$-\left(\left(2\,c\,d\,\text{Sech}[a]\,\left(\text{Cosh}[a]\,\text{Log}[\text{Cosh}[a]\,\text{Cosh}[b\,x]+\text{Sinh}[a]\,\text{Sinh}[b\,x]]-b\,x\,\text{Sinh}[a]\right)\right)\Big/\left(b^2\,\left(\text{Cosh}[a]^2-\text{Sinh}[a]^2\right)\right)\right)+\left(d^2\,\text{Csch}[a]\,\left(-b^2\,e^{-\text{ArcTanh}[\text{Coth}[a]]}\,x^2+\left(i\,\text{Coth}[a]\,\left(-b\,x\,\left(-\pi+2\,i\,\text{ArcTanh}[\text{Coth}[a]]\right)-\pi\,\text{Log}\left[1+e^{2\,b\,x}\right]-2\,\left(i\,b\,x+i\,\text{ArcTanh}[\text{Coth}[a]]\right)\,\text{Log}\left[1-e^{2\,i\,(i\,b\,x+i\,\text{ArcTanh}[\text{Coth}[a]])}\right]+\pi\,\text{Log}[\text{Cosh}[b\,x]]+2\,i\,\text{ArcTanh}[\text{Coth}[a]]\,\text{Log}[i\,\text{Sinh}[b\,x+\text{ArcTanh}[\text{Coth}[a]]]]+i\,\text{PolyLog}\left[2,\,e^{2\,i\,(i\,b\,x+i\,\text{ArcTanh}[\text{Coth}[a]])}\right]\right)\right)\Big/\left(\sqrt{1-\text{Coth}[a]^2}\right)\right)\,\text{Sech}[a]\right)\Big/\left(b^3\,\sqrt{\text{Csch}[a]^2\,\left(-\text{Cosh}[a]^2+\text{Sinh}[a]^2\right)}\right)+\frac{1}{b}\text{Sech}[a]\,\text{Sech}[a+b\,x]\,\left(c^2\,\text{Sinh}[b\,x]+2\,c\,d\,x\,\text{Sinh}[b\,x]+d^2\,x^2\,\text{Sinh}[b\,x]\right)$$

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

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

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

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

Result (type 4, 263 leaves):

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

Problem 39: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Sech}[a+b\,x]^3}{c+d\,x}\,dx$$

Optimal (type 8, 19 leaves, 0 steps):

$$\text{Int}\left[\frac{\text{Sech}[a+b\,x]^3}{c+d\,x},\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 40: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 19 leaves, 0 steps):

$$\text{Int}\left[\frac{\text{Sech}[a+b x]^3}{(c+d x)^2}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 48: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 239 leaves, 10 steps):

$$\frac{5 d (c+d x)^{3/2}}{16 b^2}+\frac{(c+d x)^{7/2}}{7 d}-\frac{5 d (c+d x)^{3/2} \text{Cosh}[a+b x]^2}{8 b^2}+\frac{15 d^{5/2} e^{-2 a+\frac{2 b c}{d}} \sqrt{\frac{\pi}{2}} \text{Erf}\left[\frac{\sqrt{2} \sqrt{b} \sqrt{c+d x}}{\sqrt{d}}\right]}{256 b^{7/2}}-\frac{15 d^{5/2} e^{2 a-\frac{2 b c}{d}} \sqrt{\frac{\pi}{2}} \text{Erfi}\left[\frac{\sqrt{2} \sqrt{b} \sqrt{c+d x}}{\sqrt{d}}\right]}{256 b^{7/2}}+\frac{(c+d x)^{5/2} \text{Cosh}[a+b x] \text{Sinh}[a+b x]}{2 b}+\frac{15 d^2 \sqrt{c+d x} \text{Sinh}[2 a+2 b x]}{64 b^3}$$

Result (type 4, 3531 leaves):

$$\frac{(c+d x)^{7/2}}{7 d}+\frac{1}{2} c^2 \text{Cosh}[2 a] \left(-\frac{1}{d}2 \left(\frac{d \sqrt{c+d x} \text{Cosh}\left[\frac{2 b (c+d x)}{d}\right]}{4 b}-\frac{d^{3/2} \sqrt{\pi} \left(\text{Erf}\left[\frac{\sqrt{2} \sqrt{b} \sqrt{c+d x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2} \sqrt{b} \sqrt{c+d x}}{\sqrt{d}}\right]\right)}{16 \sqrt{2} b^{3/2}}\right) \text{Sinh}\left[\frac{2 b c}{d}\right]+\frac{1}{d}2 \text{Cosh}\left[\frac{2 b c}{d}\right] \left(-\frac{d^{3/2} \sqrt{\pi} \left(-\text{Erf}\left[\frac{\sqrt{2} \sqrt{b} \sqrt{c+d x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2} \sqrt{b} \sqrt{c+d x}}{\sqrt{d}}\right]\right)}{16 \sqrt{2} b^{3/2}}+\frac{d \sqrt{c+d x} \text{Sinh}\left[\frac{2 b (c+d x)}{d}\right]}{4 b}\right)\right)+$$

$$c^2 \text{Cosh}[a] \text{Sinh}[a] \left(\frac{1}{d}2 \text{Cosh}\left[\frac{2 b c}{d}\right] \left(\frac{d \sqrt{c+d x} \text{Cosh}\left[\frac{2 b (c+d x)}{d}\right]}{4 b}-\right.\right.$$

$$\frac{d^{3/2}\sqrt{\pi}\left(\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]\right)}{16\sqrt{2}\,b^{3/2}}\Bigg)-\frac{1}{d}2\,\text{Sinh}\left[\frac{2 b c}{d}\right]$$

$$\left(-\frac{d^{3/2}\sqrt{\pi}\left(-\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]\right)}{16\sqrt{2}\,b^{3/2}}+\frac{d\sqrt{c+d x}\,\text{Sinh}\left[\frac{2 b (c+d x)}{d}\right]}{4 b}\right)\Bigg)+$$

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

$$\left.\frac{d^{3/2}\sqrt{\pi}\left(\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]\right)}{16\sqrt{2}\,b^{3/2}}\right)\text{Sinh}\left[\frac{2 b c}{d}\right]-$$

$$\frac{1}{d^2}2\,c\,\text{Cosh}\left[\frac{2 b c}{d}\right]\left(-\frac{d^{3/2}\sqrt{\pi}\left(-\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]\right)}{16\sqrt{2}\,b^{3/2}}+\right.$$

$$\left.\frac{d\sqrt{c+d x}\,\text{Sinh}\left[\frac{2 b (c+d x)}{d}\right]}{4 b}\right)+\frac{1}{32\sqrt{2}\,b^{5/2}\,d}$$

$$\text{Sinh}\left[\frac{2 b c}{d}\right]\left(3\,d^{3/2}\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]-3\,d^{3/2}\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+4\sqrt{2}\right.$$

$$\left.\sqrt{b}\sqrt{c+d x}\left(-4 b (c+d x)\,\text{Cosh}\left[\frac{2 b (c+d x)}{d}\right]+3 d\,\text{Sinh}\left[\frac{2 b (c+d x)}{d}\right]\right)\right)+\frac{1}{32\sqrt{2}\,b^{5/2}\,d}$$

$$\text{Cosh}\left[\frac{2 b c}{d}\right]\left(3\,d^{3/2}\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+3\,d^{3/2}\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+\right.$$

$$\left.\left.4\sqrt{2}\sqrt{b}\sqrt{c+d x}\left(-3 d\,\text{Cosh}\left[\frac{2 b (c+d x)}{d}\right]+4 b (c+d x)\,\text{Sinh}\left[\frac{2 b (c+d x)}{d}\right]\right)\right)\right)+$$

$$2\,c\,d\,\text{Cosh}[a]\,\text{Sinh}[a]\left(-\frac{1}{d^2}2\,c\,\text{Cosh}\left[\frac{2 b c}{d}\right]\left(\frac{d\sqrt{c+d x}\,\text{Cosh}\left[\frac{2 b (c+d x)}{d}\right]}{4 b}-\right.\right.$$

$$\left.\frac{d^{3/2}\sqrt{\pi}\left(\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]\right)}{16\sqrt{2}\,b^{3/2}}\right)+\frac{1}{d^2}$$

$$2\,c\,\text{Sinh}\left[\frac{2 b c}{d}\right]\left(-\frac{d^{3/2}\sqrt{\pi}\left(-\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d x}}{\sqrt{d}}\right]\right)}{16\sqrt{2}\,b^{3/2}}+\right.$$

$$\left.\frac{d\sqrt{c+d\,x}\;\mathrm{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{4\,b}\right)+\frac{1}{32\,\sqrt{2}\;b^{5/2}\,d}$$

$$\mathrm{Cosh}\left[\frac{2\,b\,c}{d}\right]\left(-3\,d^{3/2}\,\sqrt{\pi}\;\mathrm{Erf}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+3\,d^{3/2}\,\sqrt{\pi}\;\mathrm{Erfi}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+4\,\sqrt{2}\right.$$

$$\left.\sqrt{b}\;\sqrt{c+d\,x}\;\left(4\,b\,(c+d\,x)\;\mathrm{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]-3\,d\,\mathrm{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\right)-\frac{1}{32\,\sqrt{2}\;b^{5/2}\,d}$$

$$\mathrm{Sinh}\left[\frac{2\,b\,c}{d}\right]\left(3\,d^{3/2}\,\sqrt{\pi}\;\mathrm{Erf}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+3\,d^{3/2}\,\sqrt{\pi}\;\mathrm{Erfi}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+\right.$$

$$\left.\left.4\,\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}\;\left(-3\,d\,\mathrm{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]+4\,b\,(c+d\,x)\;\mathrm{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\right)\right)+$$

$$\frac{1}{2}\,d^2\,\mathrm{Cosh}[2\,a]\left(-\frac{1}{d^3}2\,c^2\left(\frac{d\sqrt{c+d\,x}\;\mathrm{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{4\,b}-\right.\right.$$

$$\left.\frac{d^{3/2}\,\sqrt{\pi}\;\left(\mathrm{Erf}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+\mathrm{Erfi}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]\right)}{16\,\sqrt{2}\;b^{3/2}}\right)\mathrm{Sinh}\left[\frac{2\,b\,c}{d}\right]+$$

$$\frac{1}{d^3}2\,c^2\,\mathrm{Cosh}\left[\frac{2\,b\,c}{d}\right]\left(-\frac{d^{3/2}\,\sqrt{\pi}\;\left(-\mathrm{Erf}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+\mathrm{Erfi}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]\right)}{16\,\sqrt{2}\;b^{3/2}}+\right.$$

$$\left.\frac{d\sqrt{c+d\,x}\;\mathrm{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{4\,b}\right)+\frac{1}{16\,\sqrt{2}\;b^{5/2}\,d^2}$$

$$c\,\mathrm{Sinh}\left[\frac{2\,b\,c}{d}\right]\left(-3\,d^{3/2}\,\sqrt{\pi}\;\mathrm{Erf}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+3\,d^{3/2}\,\sqrt{\pi}\;\mathrm{Erfi}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+4\,\sqrt{2}\right.$$

$$\left.\sqrt{b}\;\sqrt{c+d\,x}\;\left(4\,b\,(c+d\,x)\;\mathrm{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]-3\,d\,\mathrm{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\right)-\frac{1}{16\,\sqrt{2}\;b^{5/2}\,d^2}$$

$$c\,\mathrm{Cosh}\left[\frac{2\,b\,c}{d}\right]\left(3\,d^{3/2}\,\sqrt{\pi}\;\mathrm{Erf}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+3\,d^{3/2}\,\sqrt{\pi}\;\mathrm{Erfi}\left[\frac{\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}}{\sqrt{d}}\right]+\right.$$

$$\left.4\,\sqrt{2}\;\sqrt{b}\;\sqrt{c+d\,x}\;\left(-3\,d\,\mathrm{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]+4\,b\,(c+d\,x)\;\mathrm{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\right)-$$

$$\left((c+d\,x)^{3/2}\,\mathrm{Sinh}\left[\frac{2\,b\,c}{d}\right]\left(-15\,d^2\,\sqrt{\pi}\;\mathrm{Erf}\left[\sqrt{2}\;\sqrt{\frac{b\,(c+d\,x)}{d}}\;\right]-\right.\right.$$

$$15\,d^2\sqrt{\pi}\,\text{Erfi}\left[\sqrt{2}\sqrt{\frac{b\,(c+d\,x)}{d}}\right]+4\sqrt{2}\sqrt{\frac{b\,(c+d\,x)}{d}}$$

$$\left(\left(15\,d^2+16\,b^2\,(c+d\,x)^2\right)\text{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]-20\,b\,d\,(c+d\,x)\,\text{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\Bigg)\Bigg)\Bigg/$$

$$\left(128\sqrt{2}\,b^2\,d^3\left(\frac{b\,(c+d\,x)}{d}\right)^{3/2}\right)+\frac{1}{128\sqrt{2}\,b^{7/2}\,d^2}\text{Cosh}\left[\frac{2\,b\,c}{d}\right]\Bigg(15\,d^{5/2}\sqrt{\pi}$$

$$\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]-15\,d^{5/2}\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]+4\sqrt{2}\sqrt{b}\sqrt{c+d\,x}$$

$$\left(-20\,b\,d\,(c+d\,x)\,\text{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]+\left(15\,d^2+16\,b^2\,(c+d\,x)^2\right)\text{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\Bigg)\Bigg)+$$

$$d^2\,\text{Cosh}[a]\,\text{Sinh}[a]\left(\frac{1}{d^3}2\,c^2\,\text{Cosh}\left[\frac{2\,b\,c}{d}\right]\left(\frac{d\sqrt{c+d\,x}\,\text{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{4\,b}-\right.\right.$$

$$\left.\frac{d^{3/2}\sqrt{\pi}\left(\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]\right)}{16\sqrt{2}\,b^{3/2}}\right)-\frac{1}{d^3}$$

$$2\,c^2\,\text{Sinh}\left[\frac{2\,b\,c}{d}\right]\left(-\frac{d^{3/2}\sqrt{\pi}\left(-\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]+\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]\right)}{16\sqrt{2}\,b^{3/2}}+\right.$$

$$\left.\frac{d\sqrt{c+d\,x}\,\text{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]}{4\,b}\right)+\frac{1}{16\sqrt{2}\,b^{5/2}\,d^2}$$

$$c\,\text{Cosh}\left[\frac{2\,b\,c}{d}\right]\left(3\,d^{3/2}\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]-3\,d^{3/2}\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]+4\sqrt{2}\right.$$

$$\left.\sqrt{b}\sqrt{c+d\,x}\left(-4\,b\,(c+d\,x)\,\text{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]+3\,d\,\text{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\right)+\frac{1}{16\sqrt{2}\,b^{5/2}\,d^2}$$

$$c\,\text{Sinh}\left[\frac{2\,b\,c}{d}\right]\left(3\,d^{3/2}\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]+3\,d^{3/2}\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]+\right.$$

$$\left.4\sqrt{2}\sqrt{b}\sqrt{c+d\,x}\left(-3\,d\,\text{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]+4\,b\,(c+d\,x)\,\text{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\right)+$$

$$\frac{1}{128\sqrt{2}\,b^{7/2}\,d^2}\text{Cosh}\left[\frac{2\,b\,c}{d}\right]\left(-15\,d^{5/2}\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]-\right.$$

$$15\,d^{5/2}\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{2}\sqrt{b}\sqrt{c+d\,x}}{\sqrt{d}}\right]+4\sqrt{2}\sqrt{b}\sqrt{c+d\,x}$$

$$\left(\left(15\,d^2+16\,b^2\,(c+d\,x)^2\right)\,\text{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]-20\,b\,d\,(c+d\,x)\,\text{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\right)-$$

$$\frac{1}{128\,\sqrt{2}\,b^{7/2}\,d^2}\text{Sinh}\left[\frac{2\,b\,c}{d}\right]\,\left(15\,d^{5/2}\,\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{2}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]-\right.$$

$$15\,d^{5/2}\,\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{2}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]+4\,\sqrt{2}\,\sqrt{b}\,\sqrt{c+d\,x}$$

$$\left.\left(-20\,b\,d\,(c+d\,x)\,\text{Cosh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]+\left(15\,d^2+16\,b^2\,(c+d\,x)^2\right)\,\text{Sinh}\left[\frac{2\,b\,(c+d\,x)}{d}\right]\right)\right)$$

Problem 61: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 277 leaves, 18 steps):

$$-\frac{2\,\text{Cosh}[a+b\,x]^3}{3\,d\,(c+d\,x)^{3/2}}+\frac{b^{3/2}\,e^{-a+\frac{b\,c}{d}}\,\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]}{2\,d^{5/2}}+$$

$$\frac{b^{3/2}\,e^{-3\,a+\frac{3\,b\,c}{d}}\,\sqrt{3\,\pi}\,\text{Erf}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]}{2\,d^{5/2}}+\frac{b^{3/2}\,e^{a-\frac{b\,c}{d}}\,\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]}{2\,d^{5/2}}+$$

$$\frac{b^{3/2}\,e^{3\,a-\frac{3\,b\,c}{d}}\,\sqrt{3\,\pi}\,\text{Erfi}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]}{2\,d^{5/2}}-\frac{4\,b\,\text{Cosh}[a+b\,x]^2\,\text{Sinh}[a+b\,x]}{d^2\,\sqrt{c+d\,x}}$$

Result (type 4, 716 leaves):

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

$$3\,b^{3/2}\,d\,\sqrt{\pi}\,x\,\sqrt{c+d\,x}\,\mathrm{Cosh}\left[a-\frac{b\,c}{d}\right]\mathrm{Erfi}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]+$$

$$3\,b^{3/2}\,c\,\sqrt{3\,\pi}\,\sqrt{c+d\,x}\,\mathrm{Cosh}\left[3\,a-\frac{3\,b\,c}{d}\right]\mathrm{Erfi}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]+$$

$$3\,b^{3/2}\,d\,\sqrt{3\,\pi}\,x\,\sqrt{c+d\,x}\,\mathrm{Cosh}\left[3\,a-\frac{3\,b\,c}{d}\right]\mathrm{Erfi}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]+$$

$$3\,b^{3/2}\,\sqrt{3\,\pi}\,(c+d\,x)^{3/2}\,\mathrm{Erf}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\left(\mathrm{Cosh}\left[3\,a-\frac{3\,b\,c}{d}\right]-\mathrm{Sinh}\left[3\,a-\frac{3\,b\,c}{d}\right]\right)+$$

$$3\,b^{3/2}\,c\,\sqrt{3\,\pi}\,\sqrt{c+d\,x}\,\mathrm{Erfi}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\mathrm{Sinh}\left[3\,a-\frac{3\,b\,c}{d}\right]+$$

$$3\,b^{3/2}\,d\,\sqrt{3\,\pi}\,x\,\sqrt{c+d\,x}\,\mathrm{Erfi}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\mathrm{Sinh}\left[3\,a-\frac{3\,b\,c}{d}\right]+$$

$$3\,b^{3/2}\,\sqrt{\pi}\,(c+d\,x)^{3/2}\,\mathrm{Erf}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\left(\mathrm{Cosh}\left[a-\frac{b\,c}{d}\right]-\mathrm{Sinh}\left[a-\frac{b\,c}{d}\right]\right)+$$

$$3\,b^{3/2}\,c\,\sqrt{\pi}\,\sqrt{c+d\,x}\,\mathrm{Erfi}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\mathrm{Sinh}\left[a-\frac{b\,c}{d}\right]+$$

$$3\,b^{3/2}\,d\,\sqrt{\pi}\,x\,\sqrt{c+d\,x}\,\mathrm{Erfi}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\mathrm{Sinh}\left[a-\frac{b\,c}{d}\right]-6\,b\,c\,\sqrt{d}\,\mathrm{Sinh}[a+b\,x]-$$

$$6\,b\,d^{3/2}\,x\,\mathrm{Sinh}[a+b\,x]-6\,b\,c\,\sqrt{d}\,\mathrm{Sinh}[3\,(a+b\,x)]-6\,b\,d^{3/2}\,x\,\mathrm{Sinh}[3\,(a+b\,x)]\Bigg)$$

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

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

Optimal (type 4, 331 leaves, 19 steps):

$$\frac{16\,b^2\,\text{Cosh}[a+b\,x]}{5\,d^3\,\sqrt{c+d\,x}}-\frac{2\,\text{Cosh}[a+b\,x]^3}{5\,d\,(c+d\,x)^{5/2}}-\frac{24\,b^2\,\text{Cosh}[a+b\,x]^3}{5\,d^3\,\sqrt{c+d\,x}}-\frac{b^{5/2}\,e^{-a+\frac{b\,c}{d}}\,\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]}{5\,d^{7/2}}-$$
$$\frac{3\,b^{5/2}\,e^{-3\,a+\frac{3\,b\,c}{d}}\,\sqrt{3\,\pi}\,\text{Erf}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]}{5\,d^{7/2}}+\frac{b^{5/2}\,e^{a-\frac{b\,c}{d}}\,\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]}{5\,d^{7/2}}+$$
$$\frac{3\,b^{5/2}\,e^{3\,a-\frac{3\,b\,c}{d}}\,\sqrt{3\,\pi}\,\text{Erfi}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]}{5\,d^{7/2}}-\frac{4\,b\,\text{Cosh}[a+b\,x]^2\,\text{Sinh}[a+b\,x]}{5\,d^2\,(c+d\,x)^{3/2}}$$

Result (type 4, 680 leaves):

$$-\frac{1}{10\,d^{7/2}\,(c+d\,x)^{5/2}}\Bigg(4\,b^2\,c^2\,\sqrt{d}\,\text{Cosh}[a+b\,x]+$$
$$3\,d^{5/2}\,\text{Cosh}[a+b\,x]+8\,b^2\,c\,d^{3/2}\,x\,\text{Cosh}[a+b\,x]+4\,b^2\,d^{5/2}\,x^2\,\text{Cosh}[a+b\,x]+$$
$$12\,b^2\,c^2\,\sqrt{d}\,\text{Cosh}[3\,(a+b\,x)]+d^{5/2}\,\text{Cosh}[3\,(a+b\,x)]+24\,b^2\,c\,d^{3/2}\,x\,\text{Cosh}[3\,(a+b\,x)]+$$
$$12\,b^2\,d^{5/2}\,x^2\,\text{Cosh}[3\,(a+b\,x)]+2\,b^{5/2}\,\sqrt{\pi}\,(c+d\,x)^{5/2}\,\text{Cosh}\left[a-\frac{b\,c}{d}\right]\,\text{Erf}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]+$$
$$6\,b^{5/2}\,\sqrt{3\,\pi}\,(c+d\,x)^{5/2}\,\text{Cosh}\left[3\,a-\frac{3\,b\,c}{d}\right]\,\text{Erf}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]-$$
$$2\,b^{5/2}\,\sqrt{\pi}\,(c+d\,x)^{5/2}\,\text{Cosh}\left[a-\frac{b\,c}{d}\right]\,\text{Erfi}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]-$$
$$6\,b^{5/2}\,\sqrt{3\,\pi}\,(c+d\,x)^{5/2}\,\text{Cosh}\left[3\,a-\frac{3\,b\,c}{d}\right]\,\text{Erfi}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]-$$
$$6\,b^{5/2}\,\sqrt{3\,\pi}\,(c+d\,x)^{5/2}\,\text{Erf}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\,\text{Sinh}\left[3\,a-\frac{3\,b\,c}{d}\right]-$$
$$6\,b^{5/2}\,\sqrt{3\,\pi}\,(c+d\,x)^{5/2}\,\text{Erfi}\left[\frac{\sqrt{3}\,\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\,\text{Sinh}\left[3\,a-\frac{3\,b\,c}{d}\right]-$$
$$2\,b^{5/2}\,\sqrt{\pi}\,(c+d\,x)^{5/2}\,\text{Erf}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\,\text{Sinh}\left[a-\frac{b\,c}{d}\right]-$$
$$2\,b^{5/2}\,\sqrt{\pi}\,(c+d\,x)^{5/2}\,\text{Erfi}\left[\frac{\sqrt{b}\,\sqrt{c+d\,x}}{\sqrt{d}}\right]\,\text{Sinh}\left[a-\frac{b\,c}{d}\right]+2\,b\,c\,d^{3/2}\,\text{Sinh}[a+b\,x]+$$
$$2\,b\,d^{5/2}\,x\,\text{Sinh}[a+b\,x]+2\,b\,c\,d^{3/2}\,\text{Sinh}[3\,(a+b\,x)]+2\,b\,d^{5/2}\,x\,\text{Sinh}[3\,(a+b\,x)]\Bigg)$$

Problem 71: Result more than twice size of optimal antiderivative.

$$\int\left(\frac{x}{\text{Cosh}[x]^{3/2}}+x\,\sqrt{\text{Cosh}[x]}\right)dx$$

Optimal (type 3, 20 leaves, 2 steps):

$$-4\sqrt{\text{Cosh}[x]}+\frac{2\,x\,\text{Sinh}[x]}{\sqrt{\text{Cosh}[x]}}$$

Result (type 3, 46 leaves):

$$\frac{2\,\text{Sinh}[x]\left(x-\frac{2\,\text{Cosh}[x]\,\text{Sinh}[x]\sqrt{\text{Tanh}\left[\frac{x}{2}\right]^2}}{(-1+\text{Cosh}[x])^{3/2}\sqrt{1+\text{Cosh}[x]}}\right)}{\sqrt{\text{Cosh}[x]}}$$

Problem 74: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\left(\frac{x^2}{\text{Cosh}[x]^{3/2}}+x^2\sqrt{\text{Cosh}[x]}\right)dx$$

Optimal (type 4, 36 leaves, 3 steps):

$$-8\,x\sqrt{\text{Cosh}[x]}-16\,i\,\text{EllipticE}\left[\frac{i\,x}{2},2\right]+\frac{2\,x^2\,\text{Sinh}[x]}{\sqrt{\text{Cosh}[x]}}$$

Result (type 5, 76 leaves):

$$\frac{1}{1+e^{2x}}4\sqrt{\text{Cosh}[x]}\,(\text{Cosh}[x]+\text{Sinh}[x])\left(-4\,(-2+x)\,\text{Cosh}[x]+x^2\,\text{Sinh}[x]+\right.$$
$$\left.8\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2x}\right](-\text{Cosh}[x]+\text{Sinh}[x])\sqrt{1+\text{Cosh}[2x]+\text{Sinh}[2x]}\right)$$

Problem 76: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 237 leaves, 8 steps):

$$\frac{3^{-1-m}\,e^{3a-\frac{3bc}{d}}\,(c+d\,x)^m\left(-\frac{b(c+d\,x)}{d}\right)^{-m}\text{Gamma}\left[1+m,-\frac{3b(c+d\,x)}{d}\right]}{8\,b}+$$
$$\frac{3\,e^{a-\frac{bc}{d}}\,(c+d\,x)^m\left(-\frac{b(c+d\,x)}{d}\right)^{-m}\text{Gamma}\left[1+m,-\frac{b(c+d\,x)}{d}\right]}{8\,b}-$$
$$\frac{3\,e^{-a+\frac{bc}{d}}\,(c+d\,x)^m\left(\frac{b(c+d\,x)}{d}\right)^{-m}\text{Gamma}\left[1+m,\frac{b(c+d\,x)}{d}\right]}{8\,b}-$$
$$\frac{3^{-1-m}\,e^{-3a+\frac{3bc}{d}}\,(c+d\,x)^m\left(\frac{b(c+d\,x)}{d}\right)^{-m}\text{Gamma}\left[1+m,\frac{3b(c+d\,x)}{d}\right]}{8\,b}$$

Result (type 1, 1 leaves):

???

Problem 112: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 88 leaves, 6 steps):

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

Result (type 4, 472 leaves):

$$-\left(\left(8\,c\,d\,\text{Cosh}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^2\text{Sech}\left[\frac{e}{2}\right]\left(\text{Cosh}\left[\frac{e}{2}\right]\text{Log}\left[\text{Cosh}\left[\frac{e}{2}\right]\text{Cosh}\left[\frac{f\,x}{2}\right]+\text{Sinh}\left[\frac{e}{2}\right]\text{Sinh}\left[\frac{f\,x}{2}\right]\right]-\frac{1}{2}\,f\,x\,\text{Sinh}\left[\frac{e}{2}\right]\right)\right)\Big/\left(f^2\,(a+a\,\text{Cosh}[e+f\,x])\left(\text{Cosh}\left[\frac{e}{2}\right]^2-\text{Sinh}\left[\frac{e}{2}\right]^2\right)\right)\right)+$$

$$\left(8\,d^2\,\text{Cosh}\left[\frac{e}{2}+\frac{f\,x}{2}\right]^2\text{Csch}\left[\frac{e}{2}\right]\left(-\frac{1}{4}\,e^{-\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]}\,f^2\,x^2+\left(i\,\text{Coth}\left[\frac{e}{2}\right]\left(-\frac{1}{2}\,f\,x\left(-\pi+2\,i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right)-\right.\right.\right.\right.$$

$$\pi\,\text{Log}\left[1+e^{f\,x}\right]-2\left(\frac{i\,f\,x}{2}+i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right)\text{Log}\left[1-e^{2\,i\left(\frac{i\,f\,x}{2}+i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right)}\right]+$$

$$\pi\,\text{Log}\left[\text{Cosh}\left[\frac{f\,x}{2}\right]\right]+2\,i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\text{Log}\left[i\,\text{Sinh}\left[\frac{f\,x}{2}+\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right]\right]+$$

$$\left.\left.\left.i\,\text{PolyLog}\left[2,e^{2\,i\left(\frac{i\,f\,x}{2}+i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right)}\right]\right)\right)\Big/\left(\sqrt{1-\text{Coth}\left[\frac{e}{2}\right]^2}\right)\right)\text{Sech}\left[\frac{e}{2}\right]\right)\Big/$$

$$\left(f^3\,(a+a\,\text{Cosh}[e+f\,x])\sqrt{\text{Csch}\left[\frac{e}{2}\right]^2\left(-\text{Cosh}\left[\frac{e}{2}\right]^2+\text{Sinh}\left[\frac{e}{2}\right]^2\right)}\right)+$$

$$\left(2\,\text{Cosh}\left[\frac{e}{2}+\frac{f\,x}{2}\right]\text{Sech}\left[\frac{e}{2}\right]\left(c^2\,\text{Sinh}\left[\frac{f\,x}{2}\right]+2\,c\,d\,x\,\text{Sinh}\left[\frac{f\,x}{2}\right]+d^2\,x^2\,\text{Sinh}\left[\frac{f\,x}{2}\right]\right)\right)\Big/\left(f\,(a+a\,\text{Cosh}[e+f\,x])\right)$$

Problem 117: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 200 leaves, 9 steps):

$$\frac{(c+dx)^2}{3a^2 f}-\frac{4d(c+dx)\,\text{Log}\left[1+e^{e+fx}\right]}{3a^2 f^2}-\frac{4d^2\,\text{PolyLog}\left[2,-e^{e+fx}\right]}{3a^2 f^3}+\frac{d(c+dx)\,\text{Sech}\left[\frac{e}{2}+\frac{fx}{2}\right]^2}{3a^2 f^2}-\frac{2d^2\,\text{Tanh}\left[\frac{e}{2}+\frac{fx}{2}\right]}{3a^2 f^3}+\frac{(c+dx)^2\,\text{Tanh}\left[\frac{e}{2}+\frac{fx}{2}\right]}{3a^2 f}+\frac{(c+dx)^2\,\text{Sech}\left[\frac{e}{2}+\frac{fx}{2}\right]^2\text{Tanh}\left[\frac{e}{2}+\frac{fx}{2}\right]}{6a^2 f}$$

Result (type 4, 637 leaves):

$$-\left(\left(16\,c\,d\,\text{Cosh}\left[\frac{e}{2}+\frac{fx}{2}\right]^4\text{Sech}\left[\frac{e}{2}\right]\left(\text{Cosh}\left[\frac{e}{2}\right]\text{Log}\left[\text{Cosh}\left[\frac{e}{2}\right]\text{Cosh}\left[\frac{fx}{2}\right]+\text{Sinh}\left[\frac{e}{2}\right]\text{Sinh}\left[\frac{fx}{2}\right]\right]-\frac{1}{2}fx\,\text{Sinh}\left[\frac{e}{2}\right]\right)\right)\Big/\left(3f^2\left(a+a\,\text{Cosh}[e+fx]\right)^2\left(\text{Cosh}\left[\frac{e}{2}\right]^2-\text{Sinh}\left[\frac{e}{2}\right]^2\right)\right)\right)+\left(16\,d^2\,\text{Cosh}\left[\frac{e}{2}+\frac{fx}{2}\right]^4\text{Csch}\left[\frac{e}{2}\right]\left(-\frac{1}{4}e^{-\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]}f^2x^2+\left(i\,\text{Coth}\left[\frac{e}{2}\right]\left(-\frac{1}{2}fx\left(-\pi+2\,i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right)-\pi\,\text{Log}\left[1+e^{fx}\right]-2\left(\frac{i\,fx}{2}+i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right)\text{Log}\left[1-e^{2i\left(\frac{i fx}{2}+i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right)}\right]+\pi\,\text{Log}\left[\text{Cosh}\left[\frac{fx}{2}\right]\right]+2\,i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\text{Log}\left[i\,\text{Sinh}\left[\frac{fx}{2}+\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right]\right]+i\,\text{PolyLog}\left[2,e^{2i\left(\frac{i fx}{2}+i\,\text{ArcTanh}\left[\text{Coth}\left[\frac{e}{2}\right]\right]\right)}\right]\right)\right)\Big/\left(\sqrt{1-\text{Coth}\left[\frac{e}{2}\right]^2}\right)\right)\text{Sech}\left[\frac{e}{2}\right]\right)\Big/\left(3f^3\left(a+a\,\text{Cosh}[e+fx]\right)^2\sqrt{\text{Csch}\left[\frac{e}{2}\right]^2\left(-\text{Cosh}\left[\frac{e}{2}\right]^2+\text{Sinh}\left[\frac{e}{2}\right]^2\right)}\right)+\frac{1}{3f^3\left(a+a\,\text{Cosh}[e+fx]\right)^2}\text{Cosh}\left[\frac{e}{2}+\frac{fx}{2}\right]\text{Sech}\left[\frac{e}{2}\right]\left(2cdf\,\text{Cosh}\left[\frac{fx}{2}\right]+2d^2fx\,\text{Cosh}\left[\frac{fx}{2}\right]+2cdf\,\text{Cosh}\left[e+\frac{fx}{2}\right]+2d^2fx\,\text{Cosh}\left[e+\frac{fx}{2}\right]-4d^2\,\text{Sinh}\left[\frac{fx}{2}\right]+3c^2f^2\,\text{Sinh}\left[\frac{fx}{2}\right]+6cdf^2x\,\text{Sinh}\left[\frac{fx}{2}\right]+3d^2f^2x^2\,\text{Sinh}\left[\frac{fx}{2}\right]+2d^2\,\text{Sinh}\left[e+\frac{fx}{2}\right]-2d^2\,\text{Sinh}\left[e+\frac{3fx}{2}\right]+c^2f^2\,\text{Sinh}\left[e+\frac{3fx}{2}\right]+2cdf^2x\,\text{Sinh}\left[e+\frac{3fx}{2}\right]+d^2f^2x^2\,\text{Sinh}\left[e+\frac{3fx}{2}\right]\right)$$

Problem 168: Result more than twice size of optimal antiderivative.

$$\int\frac{(c+dx)^3}{a+b\,\text{Cosh}[e+fx]}\,dx$$

Optimal (type 4, 436 leaves, 12 steps):

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

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

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

Result (type 4, 1031 leaves) :

$$\frac{1}{\sqrt{-a^2+b^2}\,\sqrt{\left(a^2-b^2\right)e^{2e}}\,f^4}\left(2c^3\sqrt{\left(a^2-b^2\right)e^{2e}}\,f^3\,\text{ArcTan}\left[\frac{a+b\,e^{e+fx}}{\sqrt{-a^2+b^2}}\right]+\right.$$

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

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

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

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

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

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

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

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

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

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

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

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

Problem 173: Attempted integration timed out after 120 seconds.

$$\int\frac{(c+dx)^3}{(a+b\,\text{Cosh}[e+fx])^2}\,dx$$

Optimal (type 4, 823 leaves, 22 steps):

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

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

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

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

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

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

$$\frac{6ad^3\,\text{PolyLog}\left[4,-\frac{b\,e^{e+fx}}{a-\sqrt{a^2-b^2}}\right]}{(a^2-b^2)^{3/2}f^4}-\frac{6ad^3\,\text{PolyLog}\left[4,-\frac{b\,e^{e+fx}}{a+\sqrt{a^2-b^2}}\right]}{(a^2-b^2)^{3/2}f^4}-\frac{b(c+dx)^3\,\text{Sinh}[e+fx]}{(a^2-b^2)f(a+b\,\text{Cosh}[e+fx])}$$

Result (type 1, 1 leaves):

???

Problem 174: Result more than twice size of optimal antiderivative.

$$\int\frac{(c+dx)^2}{(a+b\,\text{Cosh}[e+fx])^2}\,dx$$

Optimal (type 4, 593 leaves, 18 steps):

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

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

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

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

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

Result (type 4, 6016 leaves):

$$\frac{1}{\left(a^2-b^2\right)\left(1+e^{2 e}\right) f}$$

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

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

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

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

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

$$\left.\left.\frac{\operatorname{PolyLog}\left[2,-\frac{b e^{2 e+f x}}{a e^{e}-\sqrt{-\left(-a^2+b^2\right) e^{2 e}}}\right]}{\left(a e^{e}-\sqrt{-\left(-a^2+b^2\right) e^{2 e}}\right) f^2}\right) \middle/ \left(\frac{-a e^{-e}-e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}}{b}-\right.\right.$$

$$\left.\left.\frac{-a\,e^{-e}+e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}}{b}\right)\right)+\left(\frac{x^2}{2\,\left(a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)\,e^{2\,e}}\right)}-\right.$$

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

$$\left.\left(\frac{-a\,e^{-e}-e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}}{b}-\frac{-a\,e^{-e}+e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}}{b}\right)\right)-$$

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

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

$$\left.\left.\frac{-a\,e^{-e}+e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}}{b}\right)\right)+\left(\frac{x^2}{2\,\left(a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)\,e^{2\,e}}\right)}-\right.$$

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

$$\left.\left(\frac{-a\,e^{-e}-e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}}{b}-\frac{-a\,e^{-e}+e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}}{b}\right)\right)-$$

$$2\,a\,d^2\left(-\left(\left(\left(-a\,e^{-e}+e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}\right)\left(\frac{x^2}{2\,\left(a\,e^{e}-\sqrt{-\left(-a^2+b^2\right)\,e^{2\,e}}\right)}-\right.\right.\right.\right.$$

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

$$\left.\left(b\left(\frac{-a\,e^{-e}-e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}}{b}-\frac{-a\,e^{-e}+e^{-2\,e}\,\sqrt{a^2\,e^{2\,e}-b^2\,e^{2\,e}}}{b}\right)\right)\right)+$$

$$\left(\left(-a\, e^{-e}-e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}\right) \left(\frac{x^2}{2 \left(a\, e^e+\sqrt{-\left(-a^2+b^2\right) e^{2 e}}\right)}-\right.\right.$$

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

$$\left.\left(b \left(\frac{-a\, e^{-e}-e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}}{b}-\frac{-a\, e^{-e}+e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}}{b}\right)\right)\right)+$$

$$2 a c d f \left(-\left(\left(\left(-a\, e^{-e}+e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}\right) \left(\frac{x^2}{2 \left(a\, e^e-\sqrt{-\left(-a^2+b^2\right) e^{2 e}}\right)}-\right.\right.\right.\right.$$

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

$$\left.\left(b \left(\frac{-a\, e^{-e}-e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}}{b}-\frac{-a\, e^{-e}+e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}}{b}\right)\right)\right)+$$

$$\left(\left(-a\, e^{-e}-e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}\right) \left(\frac{x^2}{2 \left(a\, e^e+\sqrt{-\left(-a^2+b^2\right) e^{2 e}}\right)}-\right.\right.$$

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

$$\left.\left(b \left(\frac{-a\, e^{-e}-e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}}{b}-\frac{-a\, e^{-e}+e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}}{b}\right)\right)\right)-$$

$$2 a d^2 \left(-\left(\left(e^{2 e} \left(-a\, e^{-e}+e^{-2 e} \sqrt{a^2 e^{2 e}-b^2 e^{2 e}}\right) \left(\frac{x^2}{2 \left(a\, e^e-\sqrt{-\left(-a^2+b^2\right) e^{2 e}}\right)}-\right.\right.\right.\right.$$

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

$$\left(b\left(\frac{-a\,e^{-e}-e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}}{b}-\frac{-a\,e^{-e}+e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}}{b}\right)\right)+$$

$$\left(e^{2e}\left(-a\,e^{-e}-e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}\right)\left(\frac{x^2}{2\left(a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)\,e^{2e}}\right)}-\right.\right.$$

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

$$\left(b\left(\frac{-a\,e^{-e}-e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}}{b}-\frac{-a\,e^{-e}+e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}}{b}\right)\right)+$$

$$2\,a\,c\,d\,f\left(-\left(\left(e^{2e}\left(-a\,e^{-e}+e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}\right)\left(\frac{x^2}{2\left(a\,e^{e}-\sqrt{-\left(-a^2+b^2\right)\,e^{2e}}\right)}-\right.\right.\right.\right.$$

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

$$\left(b\left(\frac{-a\,e^{-e}-e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}}{b}-\frac{-a\,e^{-e}+e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}}{b}\right)\right)+$$

$$\left(e^{2e}\left(-a\,e^{-e}-e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}\right)\left(\frac{x^2}{2\left(a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)\,e^{2e}}\right)}-\right.\right.$$

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

$$\left(b\left(\frac{-a\,e^{-e}-e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}}{b}-\frac{-a\,e^{-e}+e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}}{b}\right)\right)+$$

$$a\,d^2\,f\left(-\left(\left(\left(-a\,e^{-e}+e^{-2e}\sqrt{a^2\,e^{2e}-b^2\,e^{2e}}\right)\left(\frac{x^3}{3\left(a\,e^{e}-\sqrt{-\left(-a^2+b^2\right)\,e^{2e}}\right)}-\right.\right.\right.\right.$$

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

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

$$\left.\left(b\left(\frac{-a\, e^{-e}-e^{-2 e} \sqrt{a^2\, e^{2 e}-b^2\, e^{2 e}}}{b}-\frac{-a\, e^{-e}+e^{-2 e} \sqrt{a^2\, e^{2 e}-b^2\, e^{2 e}}}{b}\right)\right)\right)+$$

$$\left(\left(-a\, e^{-e}-e^{-2 e} \sqrt{a^2\, e^{2 e}-b^2\, e^{2 e}}\right)\left(\frac{x^3}{3\left(a\, e^{e}+\sqrt{-\left(-a^2+b^2\right)\, e^{2 e}}\right)}-\right.\right.$$

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

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

$$\left.\left(b\left(\frac{-a\, e^{-e}-e^{-2 e} \sqrt{a^2\, e^{2 e}-b^2\, e^{2 e}}}{b}-\frac{-a\, e^{-e}+e^{-2 e} \sqrt{a^2\, e^{2 e}-b^2\, e^{2 e}}}{b}\right)\right)\right)+$$

$$a\, d^2 f\left(-\left(\left(e^{2 e}\left(-a\, e^{-e}+e^{-2 e} \sqrt{a^2\, e^{2 e}-b^2\, e^{2 e}}\right)\left(\frac{x^3}{3\left(a\, e^{e}-\sqrt{-\left(-a^2+b^2\right)\, e^{2 e}}\right)}-\right.\right.\right.\right.$$

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

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

$$\left.\left(b\left(\frac{-a\, e^{-e}-e^{-2 e} \sqrt{a^2\, e^{2 e}-b^2\, e^{2 e}}}{b}-\frac{-a\, e^{-e}+e^{-2 e} \sqrt{a^2\, e^{2 e}-b^2\, e^{2 e}}}{b}\right)\right)\right)+$$

$$\left(e^{2e}\left(-a\,e^{-e}-e^{-2e}\sqrt{a^2 e^{2e}-b^2 e^{2e}}\right)\left(\frac{x^3}{3\left(a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)e^{2e}}\right)}-\frac{x^2\,\mathrm{Log}\left[1+\frac{b\,e^{2e+fx}}{a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)e^{2e}}}\right]}{\left(a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)e^{2e}}\right)f}-\frac{2\,x\,\mathrm{PolyLog}\left[2,-\frac{b\,e^{2e+fx}}{a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)e^{2e}}}\right]}{\left(a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)e^{2e}}\right)f^2}+\frac{2\,\mathrm{PolyLog}\left[3,-\frac{b\,e^{2e+fx}}{a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)e^{2e}}}\right]}{\left(a\,e^{e}+\sqrt{-\left(-a^2+b^2\right)e^{2e}}\right)f^3}\right)\right)\Big/\left(b\left(\frac{-a\,e^{-e}-e^{-2e}\sqrt{a^2 e^{2e}-b^2 e^{2e}}}{b}-\frac{-a\,e^{-e}+e^{-2e}\sqrt{a^2 e^{2e}-b^2 e^{2e}}}{b}\right)\right)\right)\right)+$$

$$\left(\mathrm{Sech}[e]\left(a\,c^2\,\mathrm{Sinh}[e]+2\,a\,c\,d\,x\,\mathrm{Sinh}[e]+a\,d^2\,x^2\,\mathrm{Sinh}[e]-b\,c^2\,\mathrm{Sinh}[f\,x]-2\,b\,c\,d\,x\,\mathrm{Sinh}[f\,x]-b\,d^2\,x^2\,\mathrm{Sinh}[f\,x]\right)\right)\Big/\left(\left(a-b\right)\left(a+b\right)f\left(a+b\,\mathrm{Cosh}[e+f\,x]\right)\right)$$

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

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

Optimal (type 4, 282 leaves, 10 steps):

$$\frac{a^2\,(c+d\,x)^{1+m}}{d\,(1+m)}+\frac{b^2\,(c+d\,x)^{1+m}}{2\,d\,(1+m)}+\frac{2^{-3-m}\,b^2\,e^{2e-\frac{2cf}{d}}\,(c+d\,x)^m\left(-\frac{f(c+d\,x)}{d}\right)^{-m}\mathrm{Gamma}\left[1+m,-\frac{2f(c+d\,x)}{d}\right]}{f}+$$

$$\frac{a\,b\,e^{e-\frac{cf}{d}}\,(c+d\,x)^m\left(-\frac{f(c+d\,x)}{d}\right)^{-m}\mathrm{Gamma}\left[1+m,-\frac{f(c+d\,x)}{d}\right]}{f}-$$

$$\frac{a\,b\,e^{-e+\frac{cf}{d}}\,(c+d\,x)^m\left(\frac{f(c+d\,x)}{d}\right)^{-m}\mathrm{Gamma}\left[1+m,\frac{f(c+d\,x)}{d}\right]}{f}-$$

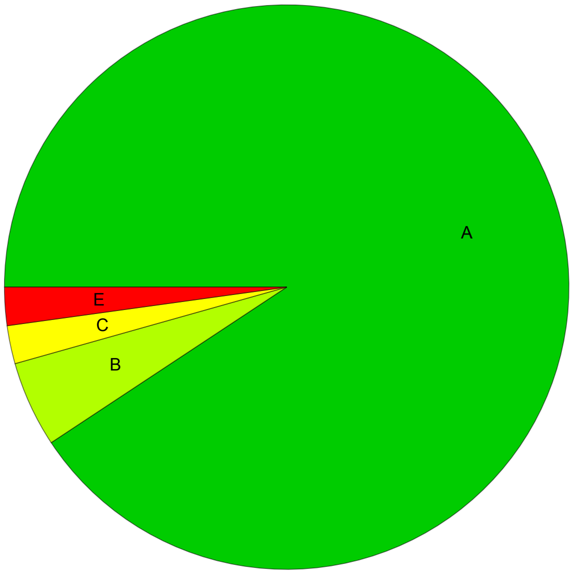
$$\frac{2^{-3-m}\,b^2\,e^{-2e+\frac{2cf}{d}}\,(c+d\,x)^m\left(\frac{f(c+d\,x)}{d}\right)^{-m}\mathrm{Gamma}\left[1+m,\frac{2f(c+d\,x)}{d}\right]}{f}$$

Result (type 4, 650 leaves):

$$\frac{1}{d\,f\,(1+m)}2^{-3-m}(c+d\,x)^m\left(-\frac{f^2(c+d\,x)^2}{d^2}\right)^{-m}$$
$$\left(2^{3+m}a^2\,c\,f\left(-\frac{f^2(c+d\,x)^2}{d^2}\right)^m+2^{2+m}b^2\,c\,f\left(-\frac{f^2(c+d\,x)^2}{d^2}\right)^m+2^{3+m}a^2\,d\,f\,x\left(-\frac{f^2(c+d\,x)^2}{d^2}\right)^m+\right.$$
$$2^{2+m}b^2\,d\,f\,x\left(-\frac{f^2(c+d\,x)^2}{d^2}\right)^m-2^{3+m}a\,b\,d\left(-\frac{f(c+d\,x)}{d}\right)^m\text{Cosh}\left[e-\frac{c\,f}{d}\right]$$
$$\text{Gamma}\left[1+m,\frac{f(c+d\,x)}{d}\right]-2^{3+m}a\,b\,d\,m\left(-\frac{f(c+d\,x)}{d}\right)^m\text{Cosh}\left[e-\frac{c\,f}{d}\right]\text{Gamma}\left[1+m,\frac{f(c+d\,x)}{d}\right]-$$
$$b^2\,d\left(-\frac{f(c+d\,x)}{d}\right)^m\text{Cosh}\left[2\,e-\frac{2\,c\,f}{d}\right]\text{Gamma}\left[1+m,\frac{2\,f(c+d\,x)}{d}\right]-$$
$$b^2\,d\,m\left(-\frac{f(c+d\,x)}{d}\right)^m\text{Cosh}\left[2\,e-\frac{2\,c\,f}{d}\right]\text{Gamma}\left[1+m,\frac{2\,f(c+d\,x)}{d}\right]+$$
$$b^2\,d\left(-\frac{f(c+d\,x)}{d}\right)^m\text{Gamma}\left[1+m,\frac{2\,f(c+d\,x)}{d}\right]\text{Sinh}\left[2\,e-\frac{2\,c\,f}{d}\right]+$$
$$b^2\,d\,m\left(-\frac{f(c+d\,x)}{d}\right)^m\text{Gamma}\left[1+m,\frac{2\,f(c+d\,x)}{d}\right]\text{Sinh}\left[2\,e-\frac{2\,c\,f}{d}\right]+$$
$$b^2\,d\,(1+m)\left(f\left(\frac{c}{d}+x\right)\right)^m\text{Gamma}\left[1+m,-\frac{2\,f(c+d\,x)}{d}\right]\left(\text{Cosh}\left[2\,e-\frac{2\,c\,f}{d}\right]+\text{Sinh}\left[2\,e-\frac{2\,c\,f}{d}\right]\right)+$$
$$2^{3+m}a\,b\,d\left(-\frac{f(c+d\,x)}{d}\right)^m\text{Gamma}\left[1+m,\frac{f(c+d\,x)}{d}\right]\text{Sinh}\left[e-\frac{c\,f}{d}\right]+$$
$$2^{3+m}a\,b\,d\,m\left(-\frac{f(c+d\,x)}{d}\right)^m\text{Gamma}\left[1+m,\frac{f(c+d\,x)}{d}\right]\text{Sinh}\left[e-\frac{c\,f}{d}\right]+$$
$$\left.2^{3+m}a\,b\,d\,(1+m)\left(f\left(\frac{c}{d}+x\right)\right)^m\text{Gamma}\left[1+m,-\frac{f(c+d\,x)}{d}\right]\left(\text{Cosh}\left[e-\frac{c\,f}{d}\right]+\text{Sinh}\left[e-\frac{c\,f}{d}\right]\right)\right)$$

Summary of Integration Test Results

183 integration problems



A - 166 optimal antiderivatives

B - 9 more than twice size of optimal antiderivatives

C - 4 unnecessarily complex antiderivatives

D - 0 unable to integrate problems

E - 4 integration timeouts