Mathematica 11.3 Integration Test Results

Test results for the 293 problems in "7.2.5 Inverse hyperbolic cosine functions.m"

Problem 4: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcCosh}[c\,x]}{d+e\,x}\,dx$$

Optimal (type 4, 178 leaves, 8 steps):

$$-\frac{\text{ArcCosh}[c\,x]^2}{2\,e}+\frac{\text{ArcCosh}[c\,x]\,\text{Log}\left[1+\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d-\sqrt{c^2\,d^2-e^2}}\right]}{e}+\frac{\text{ArcCosh}[c\,x]\,\text{Log}\left[1+\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d+\sqrt{c^2\,d^2-e^2}}\right]}{e}+\frac{\text{PolyLog}\left[2,-\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d-\sqrt{c^2\,d^2-e^2}}\right]}{e}+\frac{\text{PolyLog}\left[2,-\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d+\sqrt{c^2\,d^2-e^2}}\right]}{e}$$

Result (type 4, 281 leaves):

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

Problem 7: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcCosh}[c x]}{(d+e x)^4} \, dx$$

Optimal (type 3, 195 leaves, 6 steps):

$$-\frac{c \sqrt{-1+c x} \sqrt{1+c x}}{6 \left(c^2 d^2-e^2\right) (d+e x)^2}-\frac{c^3 d \sqrt{-1+c x} \sqrt{1+c x}}{2 (c d-e)^2 (c d+e)^2 (d+e x)}-\frac{\text{ArcCosh}[c x]}{3 e (d+e x)^3}+\frac{c^3 \left(2 c^2 d^2+e^2\right) \text{ArcTanh}\left[\frac{\sqrt{c d+e} \sqrt{1+c x}}{\sqrt{c d-e} \sqrt{-1+c x}}\right]}{3 (c d-e)^{5/2} e (c d+e)^{5/2}}$$

Result (type 3, 244 leaves):

$$\frac{1}{6} \left(\frac{c \sqrt{-1+c x} \sqrt{1+c x} \left(e^2-c^2 d (4 d+3 e x)\right)}{\left(-c^2 d^2+e^2\right)^2 (d+e x)^2}-\frac{2 \text{ArcCosh}[c x]}{e (d+e x)^3}-\left(i c^3 \left(2 c^2 d^2+e^2\right) \text{Log}\left[\left(12 e^2 (-c d+e)^2 (c d+e)^2 \left(-i e-i c^2 d x+\sqrt{-c^2 d^2+e^2} \sqrt{-1+c x} \sqrt{1+c x}\right)\right) \Big/ \left(c^3 \sqrt{-c^2 d^2+e^2} \left(2 c^2 d^2+e^2\right) (d+e x)\right)\right]\right) \Big/ \left(e (-c d+e)^2 (c d+e)^2 \sqrt{-c^2 d^2+e^2}\right)\right)$$

Problem 11: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcCosh}[c x]^2}{d+e x} \, dx$$

Optimal (type 4, 272 leaves, 10 steps):

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

Result (type 4, 766 leaves):

$$-\frac{1}{3 e}\left(\text{ArcCosh}[c x]^3-3 \text{ArcCosh}[c x]^2 \text{Log}\left[1+\frac{\left(c d-\sqrt{c^2 d^2-e^2}\right) e^{-\text{ArcCosh}[c x]}}{e}\right]+\right.$$

$$12 i \text{ArcCosh}[c x] \text{ArcSin}\left[\frac{\sqrt{1+\frac{c d}{e}}}{\sqrt{2}}\right] \text{Log}\left[1+\frac{\left(c d-\sqrt{c^2 d^2-e^2}\right) e^{-\text{ArcCosh}[c x]}}{e}\right]-$$

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

$$12 i \text{ArcCosh}[c x] \text{ArcSin}\left[\frac{\sqrt{1+\frac{c d}{e}}}{\sqrt{2}}\right] \text{Log}\left[1+\frac{\left(c d+\sqrt{c^2 d^2-e^2}\right) e^{-\text{ArcCosh}[c x]}}{e}\right]-$$

$$3 \text{ArcCosh}[c x]^2 \text{Log}\left[1+\frac{e\, e^{\text{ArcCosh}[c x]}}{c d-\sqrt{c^2 d^2-e^2}}\right]-3 \text{ArcCosh}[c x]^2 \text{Log}\left[1+\frac{e\, e^{\text{ArcCosh}[c x]}}{c d+\sqrt{c^2 d^2-e^2}}\right]+$$

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

$$12 i \text{ArcCosh}[c x] \text{ArcSin}\left[\frac{\sqrt{1+\frac{c d}{e}}}{\sqrt{2}}\right] \text{Log}\left[1+\frac{\left(c d+\sqrt{c^2 d^2-e^2}\right)\left(c x-\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\right)}{e}\right]+$$

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

$$12 i \text{ArcCosh}[c x] \text{ArcSin}\left[\frac{\sqrt{1+\frac{c d}{e}}}{\sqrt{2}}\right] \text{Log}\left[1+\frac{\left(-c d+\sqrt{c^2 d^2-e^2}\right)\left(-c x+\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\right)}{e}\right]-$$

$$6 \text{ArcCosh}[c x] \text{PolyLog}\left[2,\frac{e\, e^{\text{ArcCosh}[c x]}}{-c d+\sqrt{c^2 d^2-e^2}}\right]-$$

$$6 \text{ArcCosh}[c x] \text{PolyLog}\left[2,-\frac{e\, e^{\text{ArcCosh}[c x]}}{c d+\sqrt{c^2 d^2-e^2}}\right]+$$

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

Problem 12: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

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

Optimal (type 4, 259 leaves, 10 steps):

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

Result (type 4, 848 leaves):

$$
\begin{aligned}
&-\frac{1}{e} c \left(\frac{\text{ArcCosh}[c x]^2}{c d+c e x}+\frac{1}{\sqrt{-c^2 d^2+e^2}} 2 \left(2 \text{ArcCosh}[c x] \text{ArcTan}\left[\frac{(c d+e) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]-2 i\right.\right. \\
&\quad \text{ArcCos}\left[-\frac{c d}{e}\right] \text{ArcTan}\left[\frac{(-c d+e) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]+ \\
&\quad \left(\text{ArcCos}\left[-\frac{c d}{e}\right]+2 \left(\text{ArcTan}\left[\frac{(c d+e) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]+\text{ArcTan}\left[\right.\right.\right. \\
&\qquad \left.\left.\left.\frac{(-c d+e) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right)\right) \text{Log}\left[\frac{\sqrt{-c^2 d^2+e^2}\, e^{-\frac{1}{2} \text{ArcCosh}[c x]}}{\sqrt{2} \sqrt{e} \sqrt{c d+c e x}}\right]+ \\
&\quad \left(\text{ArcCos}\left[-\frac{c d}{e}\right]-2 \left(\text{ArcTan}\left[\frac{(c d+e) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]+\text{ArcTan}\left[\right.\right.\right. \\
&\qquad \left.\left.\left.\frac{(-c d+e) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right)\right) \text{Log}\left[\frac{\sqrt{-c^2 d^2+e^2}\, e^{\frac{1}{2} \text{ArcCosh}[c x]}}{\sqrt{2} \sqrt{e} \sqrt{c d+c e x}}\right]- \\
&\quad \left(\text{ArcCos}\left[-\frac{c d}{e}\right]+2 \text{ArcTan}\left[\frac{(-c d+e) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right) \\
&\quad \text{Log}\left[\left((c d+e) \left(c d-e+i \sqrt{-c^2 d^2+e^2}\right) \left(-1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right/ \\
&\qquad \left.\left(e \left(c d+e+i \sqrt{-c^2 d^2+e^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right]- \\
&\quad \left(\text{ArcCos}\left[-\frac{c d}{e}\right]-2 \text{ArcTan}\left[\frac{(-c d+e) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right) \\
&\quad \text{Log}\left[\left((c d+e) \left(-c d+e+i \sqrt{-c^2 d^2+e^2}\right) \left(1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right/ \\
&\qquad \left.\left(e \left(c d+e+i \sqrt{-c^2 d^2+e^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right]+ \\
&\quad i \left(\text{PolyLog}\left[2, \left(\left(c d-i \sqrt{-c^2 d^2+e^2}\right) \left(c d+e-i \sqrt{-c^2 d^2+e^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right/\right. \\
&\qquad \left.\left(e \left(c d+e+i \sqrt{-c^2 d^2+e^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\right. \\
&\qquad \left(\left(c d+i \sqrt{-c^2 d^2+e^2}\right) \left(c d+e-i \sqrt{-c^2 d^2+e^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\Big/ \\
&\qquad \left.\left.\left.\left.\left(e \left(c d+e+i \sqrt{-c^2 d^2+e^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right]\right)\right)\right)
\end{aligned}
$$

Problem 13: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 352 leaves, 13 steps):

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

Result (type 4, 936 leaves):

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

$$\frac{1}{e\,(-c^2 d^2+e^2)^{3/2}}\,c d\left(2\,\text{ArcCosh}[c x]\,\text{ArcTan}\left[\frac{(c d+e)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]-\right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c d}{e}\right]\text{ArcTan}\left[\frac{(-c d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c d}{e}\right]+2\left(\text{ArcTan}\left[\frac{(c d+e)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]+\right.\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{(-c d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{-c^2 d^2+e^2}\,e^{-\frac{1}{2}\text{ArcCosh}[c x]}}{\sqrt{2}\,\sqrt{e}\,\sqrt{c d+c e x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c d}{e}\right]-2\left(\text{ArcTan}\left[\frac{(c d+e)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]+\right.\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{(-c d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{-c^2 d^2+e^2}\,e^{\frac{1}{2}\text{ArcCosh}[c x]}}{\sqrt{2}\,\sqrt{e}\,\sqrt{c d+c e x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c d}{e}\right]+2\,\text{ArcTan}\left[\frac{(-c d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,d+e)\left(c\,d-e+i\sqrt{-c^2\,d^2+e^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(e\left(c\,d+e+i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]-2\,\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,d+e)\left(-c\,d+e+i\sqrt{-c^2\,d^2+e^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(e\left(c\,d+e+i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]+$$

$$i\left(\text{PolyLog}\left[2,\left(\left(c\,d-i\sqrt{-c^2\,d^2+e^2}\right)\left(c\,d+e-i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(e\left(c\,d+e+i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\right.$$

$$\left.\text{PolyLog}\left[2,\left(\left(c\,d+i\sqrt{-c^2\,d^2+e^2}\right)\left(c\,d+e-i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(e\left(c\,d+e+i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]\right)\Bigg)$$

Problem 17: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 195 leaves, 8 steps):

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

Result (type 4, 294 leaves):

$$\frac{a\,\mathrm{Log}[d+e\,x]}{e}+$$

$$\frac{1}{e}b\left(\frac{1}{2}\mathrm{ArcCosh}[c\,x]^2+4\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{c\,d}{e}}}{\sqrt{2}}\right]\mathrm{ArcTanh}\left[\frac{(c\,d-e)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d^2-e^2}}\right]+\right.$$

$$\left(\mathrm{ArcCosh}[c\,x]-2\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{c\,d}{e}}}{\sqrt{2}}\right]\right)\mathrm{Log}\left[1+\frac{\left(c\,d-\sqrt{c^2\,d^2-e^2}\right)e^{-\mathrm{ArcCosh}[c\,x]}}{e}\right]+$$

$$\left(\mathrm{ArcCosh}[c\,x]+2\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{c\,d}{e}}}{\sqrt{2}}\right]\right)\mathrm{Log}\left[1+\frac{\left(c\,d+\sqrt{c^2\,d^2-e^2}\right)e^{-\mathrm{ArcCosh}[c\,x]}}{e}\right]-\mathrm{PolyLog}\left[\right.$$

$$\left.\left.2,\frac{\left(-c\,d+\sqrt{c^2\,d^2-e^2}\right)e^{-\mathrm{ArcCosh}[c\,x]}}{e}\right]-\mathrm{PolyLog}\left[2,-\frac{\left(c\,d+\sqrt{c^2\,d^2-e^2}\right)e^{-\mathrm{ArcCosh}[c\,x]}}{e}\right]\right)$$

Problem 20: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{a+b\,\mathrm{ArcCosh}[c\,x]}{(d+e\,x)^4}\,dx$$

Optimal (type 3, 202 leaves, 6 steps):

$$-\frac{b\,c\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}{6\,(c^2\,d^2-e^2)\,(d+e\,x)^2}-\frac{b\,c^3\,d\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}{2\,(c\,d-e)^2\,(c\,d+e)^2\,(d+e\,x)}-$$

$$\frac{a+b\,\mathrm{ArcCosh}[c\,x]}{3\,e\,(d+e\,x)^3}+\frac{b\,c^3\,(2\,c^2\,d^2+e^2)\,\mathrm{ArcTanh}\left[\frac{\sqrt{c\,d+e}\,\sqrt{1+c\,x}}{\sqrt{c\,d-e}\,\sqrt{-1+c\,x}}\right]}{3\,(c\,d-e)^{5/2}\,e\,(c\,d+e)^{5/2}}$$

Result (type 3, 259 leaves):

$$-\frac{1}{6 e}\left(\frac{2 a+\frac{b c e \sqrt{-1+c x} \sqrt{1+c x} (d+e x) \left(-e^2+c^2 d (4 d+3 e x)\right)}{\left(-c^2 d^2+e^2\right)^2}}{(d+e x)^3}+\frac{2 b \text{ArcCosh}[c x]}{(d+e x)^3}+\left(i b c^3 \left(2 c^2 d^2+e^2\right) \text{Log}\left[\left(12 e^2 (-c d+e)^2 (c d+e)^2 \left(-i e-i c^2 d x+\sqrt{-c^2 d^2+e^2} \sqrt{-1+c x} \sqrt{1+c x}\right)\right)\Big/\left(b c^3 \sqrt{-c^2 d^2+e^2} \left(2 c^2 d^2+e^2\right) (d+e x)\right)\right]\right)\Big/\left((-c d+e)^2 (c d+e)^2 \sqrt{-c^2 d^2+e^2}\right)\right)$$

Problem 24: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 303 leaves, 10 steps):

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

Result (type 4, 1064 leaves):

$$\frac{1}{3 e}\left(3 a^2 \text{Log}[d+e x]+6 a b \left(\frac{1}{2} \text{ArcCosh}[c x]^2+4 i \text{ArcSin}\left[\frac{\sqrt{1+\frac{c d}{e}}}{\sqrt{2}}\right] \text{ArcTanh}\left[\frac{(c d-e) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{c^2 d^2-e^2}}\right]+\right.\right.$$

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

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

$$\left. 2, \frac{\left(-c\,d+\sqrt{c^2\,d^2-e^2}\right)\,e^{-\text{ArcCosh}[c\,x]}}{e}\right] - \text{PolyLog}\left[2, -\frac{\left(c\,d+\sqrt{c^2\,d^2-e^2}\right)\,e^{-\text{ArcCosh}[c\,x]}}{e}\right]\Bigg) -$$

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

$$12\,i\,\text{ArcCosh}[c\,x]\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{c\,d}{e}}}{\sqrt{2}}\right]\,\text{Log}\left[1+\frac{\left(c\,d-\sqrt{c^2\,d^2-e^2}\right)\,e^{-\text{ArcCosh}[c\,x]}}{e}\right] -$$

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

$$12\,i\,\text{ArcCosh}[c\,x]\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{c\,d}{e}}}{\sqrt{2}}\right]\,\text{Log}\left[1+\frac{\left(c\,d+\sqrt{c^2\,d^2-e^2}\right)\,e^{-\text{ArcCosh}[c\,x]}}{e}\right] -$$

$$3\,\text{ArcCosh}[c\,x]^2\,\text{Log}\left[1+\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d-\sqrt{c^2\,d^2-e^2}}\right] - 3\,\text{ArcCosh}[c\,x]^2\,\text{Log}\left[1+\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d+\sqrt{c^2\,d^2-e^2}}\right] +$$

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

$$12\,i\,\text{ArcCosh}[c\,x]\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{c\,d}{e}}}{\sqrt{2}}\right]\,\text{Log}\left[1+\frac{\left(c\,d+\sqrt{c^2\,d^2-e^2}\right)\left(c\,x-\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)}{e}\right] +$$

$$3\,\text{ArcCosh}[c\,x]^2\,\text{Log}\left[1+\frac{\left(-c\,d+\sqrt{c^2\,d^2-e^2}\right)\left(-c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)}{e}\right] - 12\,i\,\text{ArcCosh}[c\,x]$$

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

$$6\,\text{ArcCosh}[c\,x]\,\text{PolyLog}\left[2,\frac{e\,e^{\text{ArcCosh}[c\,x]}}{-c\,d+\sqrt{c^2\,d^2-e^2}}\right]-$$

$$6\,\text{ArcCosh}[c\,x]\,\text{PolyLog}\left[2,-\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d+\sqrt{c^2\,d^2-e^2}}\right]+$$

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

Problem 25: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 279 leaves, 10 steps):

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

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

$$\frac{2\,b^2\,c\,\text{PolyLog}\left[2,-\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d-\sqrt{c^2\,d^2-e^2}}\right]}{e\,\sqrt{c^2\,d^2-e^2}}-\frac{2\,b^2\,c\,\text{PolyLog}\left[2,-\frac{e\,e^{\text{ArcCosh}[c\,x]}}{c\,d+\sqrt{c^2\,d^2-e^2}}\right]}{e\,\sqrt{c^2\,d^2-e^2}}$$

Result (type 4, 943 leaves):

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

$$\left(\frac{\text{ArcCosh}[c\,x]^2}{c\,d+c\,e\,x}+\frac{1}{\sqrt{-c^2\,d^2+e^2}}\,2\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,d+e)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]-\right.\right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c\,d}{e}\right]\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]+2\left(\text{ArcTan}\left[\frac{(c\,d+e)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]+\right.\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{-c^2 d^2+e^2}\,e^{-\frac{1}{2}\text{ArcCosh}[c\,x]}}{\sqrt{2}\,\sqrt{e}\,\sqrt{c\,(d+e\,x)}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]-2\left(\text{ArcTan}\left[\frac{(c\,d+e)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

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

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]+2\,\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,d+e)\left(c\,d-e+i\sqrt{-c^2 d^2+e^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(e\left(c\,d+e+i\sqrt{-c^2 d^2+e^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]-2\,\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 d^2+e^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,d+e)\left(-c\,d+e+i\sqrt{-c^2 d^2+e^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

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

$$\left(\left(c\,d-i\sqrt{-c^2 d^2+e^2}\right)\left(c\,d+e-i\sqrt{-c^2 d^2+e^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/$$

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

$$\left(\left(c\,d+i\sqrt{-c^2 d^2+e^2}\right)\left(c\,d+e-i\sqrt{-c^2 d^2+e^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/$$

$$\left.\left.\left.\left(e\left(c\,d+e+i\sqrt{-c^2 d^2+e^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]\right)\right)$$

Problem 26: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 380 leaves, 13 steps):

$$-\frac{b\,c\,\sqrt{-\frac{1-c\,x}{1+c\,x}}\,(1+c\,x)\,(a+b\,\text{ArcCosh}[c\,x])}{(c^2\,d^2-e^2)\,(d+e\,x)}-\frac{(a+b\,\text{ArcCosh}[c\,x])^2}{2\,e\,(d+e\,x)^2}+$$

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

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

Result (type 4, 1100 leaves):

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

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

$$\frac{1}{e\,(-c^2\,d^2+e^2)^{3/2}}\,c\,d\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,d+e)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]-\right.$$

$$2\,\mathrm{i}\,\text{ArcCos}\left[-\frac{c\,d}{e}\right]\,\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]+2\left(\text{ArcTan}\left[\frac{(c\,d+e)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]+\right.\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]\right)\right)\,\text{Log}\left[\frac{\sqrt{-c^2\,d^2+e^2}\,e^{-\frac{1}{2}\text{ArcCosh}[c\,x]}}{\sqrt{2}\,\sqrt{e}\,\sqrt{c\,d+c\,e\,x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]-2\left(\text{ArcTan}\left[\frac{(c\,d+e)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]+\right.\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]\right)\right)\,\text{Log}\left[\frac{\sqrt{-c^2\,d^2+e^2}\,e^{\frac{1}{2}\text{ArcCosh}[c\,x]}}{\sqrt{2}\,\sqrt{e}\,\sqrt{c\,d+c\,e\,x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]+2\,\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,d+e)\left(c\,d-e+i\sqrt{-c^2\,d^2+e^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(e\left(c\,d+e+i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,d}{e}\right]-2\,\text{ArcTan}\left[\frac{(-c\,d+e)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,d^2+e^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,d+e)\left(-c\,d+e+i\sqrt{-c^2\,d^2+e^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(e\left(c\,d+e+i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]+$$

$$i\left(\text{PolyLog}\left[2,\left(\left(c\,d-i\sqrt{-c^2\,d^2+e^2}\right)\left(c\,d+e-i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(e\left(c\,d+e+i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\right.$$

$$\left.\text{PolyLog}\left[2,\left(\left(c\,d+i\sqrt{-c^2\,d^2+e^2}\right)\left(c\,d+e-i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(e\left(c\,d+e+i\sqrt{-c^2\,d^2+e^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]\right)\Bigg)\Bigg)$$

Problem 35: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 21 leaves, 0 steps):

$$\text{Int}\left[\frac{1}{(d+e\,x)^2\,(a+b\,\text{ArcCosh}[c\,x])^2},\,x\right]$$

Result (type 1, 1 leaves):

???

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

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

Optimal (type 6, 125 leaves, 3 steps):

$$-\frac{1}{c\,e\,(1+m)}\sqrt{2}\,b\,(c\,d+e)\,\sqrt{-1+c\,x}\,(d+e\,x)^m\left(\frac{c\,(d+e\,x)}{c\,d+e}\right)^{-m}\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-1-m,\frac{3}{2},\frac{1}{2}(1-c\,x),\frac{e\,(1-c\,x)}{c\,d+e}\right]+\frac{(d+e\,x)^{1+m}\,(a+b\,\text{ArcCosh}[c\,x])}{e\,(1+m)}$$

Result (type 6, 715 leaves) :

$$\frac{a (d+e x)^{1+m}}{e (1+m)}+\frac{1}{c} b \left(\left(\left(12 c d (c d+e) \sqrt{\frac{-1+c x}{1+c x}} \left(\frac{c d+e+e (-1+c x)}{c}\right)^m \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2} (1-c x),-\frac{e (-1+c x)}{c d+e}\right]\right)\Big/\left(e (1+m) \left(-6 (c d+e) \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2} (1-c x),-\frac{e (-1+c x)}{c d+e}\right]-4 e m (-1+c x) \text{AppellF1}\left[\frac{3}{2},\frac{1}{2},1-m,\frac{5}{2},\frac{1}{2} (1-c x),-\frac{e (-1+c x)}{c d+e}\right]+(c d+e) (-1+c x) \text{AppellF1}\left[\frac{3}{2},\frac{3}{2},-m,\frac{5}{2},\frac{1}{2} (1-c x),-\frac{e (-1+c x)}{c d+e}\right]\right)\right)\right)-\frac{1}{1+m} 12 (c d+e) (d+e x)^m \left(\left(\sqrt{-1+c x} \sqrt{1+c x} \text{AppellF1}\left[\frac{1}{2},-\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}-\frac{c x}{2},\frac{e-c e x}{c d+e}\right]\right)\Big/\left(6 (c d+e) \text{AppellF1}\left[\frac{1}{2},-\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}-\frac{c x}{2},\frac{e-c e x}{c d+e}\right]+4 e m (-1+c x) \text{AppellF1}\left[\frac{3}{2},-\frac{1}{2},1-m,\frac{5}{2},\frac{1}{2}-\frac{c x}{2},\frac{e-c e x}{c d+e}\right]+(c d+e) (-1+c x) \text{AppellF1}\left[\frac{3}{2},\frac{1}{2},-m,\frac{5}{2},\frac{1}{2}-\frac{c x}{2},\frac{e-c e x}{c d+e}\right]\right)+\left(\sqrt{\frac{-1+c x}{1+c x}} \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}-\frac{c x}{2},\frac{e-c e x}{c d+e}\right]\right)\Big/\left(-6 (c d+e) \text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}-\frac{c x}{2},\frac{e-c e x}{c d+e}\right]-4 e m (-1+c x) \text{AppellF1}\left[\frac{3}{2},\frac{1}{2},1-m,\frac{5}{2},\frac{1}{2}-\frac{c x}{2},\frac{e-c e x}{c d+e}\right]+(c d+e) (-1+c x) \text{AppellF1}\left[\frac{3}{2},\frac{3}{2},-m,\frac{5}{2},\frac{1}{2}-\frac{c x}{2},\frac{e-c e x}{c d+e}\right]\right)\right)+\frac{(d+e x)^m (c d+c e x) \text{ArcCosh}[c x]}{e (1+m)}\right)$$

Problem 45: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcCosh}[a x]}{c+d x^2} \, dx$$

Optimal (type 4, 481 leaves, 18 steps) :

$$\frac{\text{ArcCosh}[a x]\,\text{Log}\left[1-\frac{\sqrt{d}\,e^{\text{ArcCosh}[a x]}}{a\sqrt{-c}-\sqrt{-a^2 c-d}}\right]}{2\sqrt{-c}\,\sqrt{d}}-\frac{\text{ArcCosh}[a x]\,\text{Log}\left[1+\frac{\sqrt{d}\,e^{\text{ArcCosh}[a x]}}{a\sqrt{-c}-\sqrt{-a^2 c-d}}\right]}{2\sqrt{-c}\,\sqrt{d}}+$$

$$\frac{\text{ArcCosh}[a x]\,\text{Log}\left[1-\frac{\sqrt{d}\,e^{\text{ArcCosh}[a x]}}{a\sqrt{-c}+\sqrt{-a^2 c-d}}\right]}{2\sqrt{-c}\,\sqrt{d}}-\frac{\text{ArcCosh}[a x]\,\text{Log}\left[1+\frac{\sqrt{d}\,e^{\text{ArcCosh}[a x]}}{a\sqrt{-c}+\sqrt{-a^2 c-d}}\right]}{2\sqrt{-c}\,\sqrt{d}}-$$

$$\frac{\text{PolyLog}\left[2,-\frac{\sqrt{d}\,e^{\text{ArcCosh}[a x]}}{a\sqrt{-c}-\sqrt{-a^2 c-d}}\right]}{2\sqrt{-c}\,\sqrt{d}}+\frac{\text{PolyLog}\left[2,\frac{\sqrt{d}\,e^{\text{ArcCosh}[a x]}}{a\sqrt{-c}-\sqrt{-a^2 c-d}}\right]}{2\sqrt{-c}\,\sqrt{d}}-$$

$$\frac{\text{PolyLog}\left[2,-\frac{\sqrt{d}\,e^{\text{ArcCosh}[a x]}}{a\sqrt{-c}+\sqrt{-a^2 c-d}}\right]}{2\sqrt{-c}\,\sqrt{d}}+\frac{\text{PolyLog}\left[2,\frac{\sqrt{d}\,e^{\text{ArcCosh}[a x]}}{a\sqrt{-c}+\sqrt{-a^2 c-d}}\right]}{2\sqrt{-c}\,\sqrt{d}}$$

Result (type 4, 791 leaves):

$$\frac{1}{2\sqrt{c}\,\sqrt{d}}\left(4\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i a\sqrt{c}}{\sqrt{d}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(a\sqrt{c}-i\sqrt{d}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[a x]\right]}{\sqrt{a^2 c+d}}\right]-\right.$$

$$4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i a\sqrt{c}}{\sqrt{d}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(a\sqrt{c}+i\sqrt{d}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[a x]\right]}{\sqrt{a^2 c+d}}\right]+$$

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

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

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

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

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

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

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

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

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

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

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

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

Problem 46: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 774 leaves, 26 steps):

$$-\frac{\text{ArcCosh}[a\,x]}{4\,c\sqrt{d}\left(\sqrt{-c}-\sqrt{d}\,x\right)}+\frac{\text{ArcCosh}[a\,x]}{4\,c\sqrt{d}\left(\sqrt{-c}+\sqrt{d}\,x\right)}+\frac{a\,\text{ArcTanh}\left[\frac{\sqrt{a\sqrt{-c}-\sqrt{d}}\,\sqrt{1+a\,x}}{\sqrt{a\sqrt{-c}+\sqrt{d}}\,\sqrt{-1+a\,x}}\right]}{2\,c\sqrt{a\sqrt{-c}-\sqrt{d}}\,\sqrt{a\sqrt{-c}+\sqrt{d}}\,\sqrt{d}}-$$

$$\frac{a\,\text{ArcTanh}\left[\frac{\sqrt{a\sqrt{-c}+\sqrt{d}}\,\sqrt{1+a\,x}}{\sqrt{a\sqrt{-c}-\sqrt{d}}\,\sqrt{-1+a\,x}}\right]}{2\,c\sqrt{a\sqrt{-c}-\sqrt{d}}\,\sqrt{a\sqrt{-c}+\sqrt{d}}\,\sqrt{d}}-\frac{\text{ArcCosh}[a\,x]\,\text{Log}\left[1-\frac{\sqrt{d}\,e^{\text{ArcCosh}[a\,x]}}{a\sqrt{-c}-\sqrt{-a^2\,c-d}}\right]}{4\,(-c)^{3/2}\sqrt{d}}+$$

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

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

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

Result (type 4, 1080 leaves):

$$\frac{1}{4 c^{3/2}\sqrt{d}}\left(\frac{\sqrt{c}\ \text{ArcCosh}[a x]}{-i\sqrt{c}+\sqrt{d}\ x}+\frac{\sqrt{c}\ \text{ArcCosh}[a x]}{i\sqrt{c}+\sqrt{d}\ x}+\right.$$

$$4\,\text{ArcSin}\Big[\frac{\sqrt{1-\frac{i a\sqrt{c}}{\sqrt{d}}}}{\sqrt{2}}\Big]\ \text{ArcTanh}\Big[\frac{\left(a\sqrt{c}-i\sqrt{d}\right)\ \text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[a x]\right]}{\sqrt{a^2 c+d}}\Big]-$$

$$4\,\text{ArcSin}\Big[\frac{\sqrt{1+\frac{i a\sqrt{c}}{\sqrt{d}}}}{\sqrt{2}}\Big]\ \text{ArcTanh}\Big[\frac{\left(a\sqrt{c}+i\sqrt{d}\right)\ \text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[a x]\right]}{\sqrt{a^2 c+d}}\Big]+$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 56: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{d-c^2 d x^2}\,\left(a+b\,\text{ArcCosh}[c x]\right)}{f+g x}\,dx$$

Optimal (type 4, 785 leaves, 23 steps) :

$$-\frac{b c x \sqrt{d-c^2 d x^2}}{g \sqrt{-1+c x} \sqrt{1+c x}}+\frac{a \left(1-c^2 x^2\right) \sqrt{d-c^2 d x^2}}{g (1-c x) (1+c x)}+$$

$$\frac{b \sqrt{d-c^2 d x^2} \text{ArcCosh}[c x]}{g}-\frac{c x \sqrt{d-c^2 d x^2} (a+b \text{ArcCosh}[c x])^2}{2 b g \sqrt{-1+c x} \sqrt{1+c x}}+$$

$$\frac{\left(1-\frac{c^2 f^2}{g^2}\right) \sqrt{d-c^2 d x^2} (a+b \text{ArcCosh}[c x])^2}{2 b c \sqrt{-1+c x} \sqrt{1+c x} (f+g x)}-\frac{\left(1-c^2 x^2\right) \sqrt{d-c^2 d x^2} (a+b \text{ArcCosh}[c x])^2}{2 b c \sqrt{-1+c x} \sqrt{1+c x} (f+g x)}-$$

$$\frac{a \sqrt{c^2 f^2-g^2} \sqrt{-1+c^2 x^2} \sqrt{d-c^2 d x^2} \text{ArcTanh}\left[\frac{g+c^2 f x}{\sqrt{c^2 f^2-g^2} \sqrt{-1+c^2 x^2}}\right]}{g^2 (1-c x) (1+c x)}+$$

$$\frac{b \sqrt{c^2 f^2-g^2} \sqrt{d-c^2 d x^2} \text{ArcCosh}[c x] \text{Log}\left[1+\frac{e^{\text{ArcCosh}[c x]} g}{c f-\sqrt{c^2 f^2-g^2}}\right]}{g^2 \sqrt{-1+c x} \sqrt{1+c x}}-$$

$$\frac{b \sqrt{c^2 f^2-g^2} \sqrt{d-c^2 d x^2} \text{ArcCosh}[c x] \text{Log}\left[1+\frac{e^{\text{ArcCosh}[c x]} g}{c f+\sqrt{c^2 f^2-g^2}}\right]}{g^2 \sqrt{-1+c x} \sqrt{1+c x}}+$$

$$\frac{b \sqrt{c^2 f^2-g^2} \sqrt{d-c^2 d x^2} \text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c x]} g}{c f-\sqrt{c^2 f^2-g^2}}\right]}{g^2 \sqrt{-1+c x} \sqrt{1+c x}}-$$

$$\frac{b \sqrt{c^2 f^2-g^2} \sqrt{d-c^2 d x^2} \text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c x]} g}{c f+\sqrt{c^2 f^2-g^2}}\right]}{g^2 \sqrt{-1+c x} \sqrt{1+c x}}$$

Result (type 4, 1121 leaves):

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

$$2 a \sqrt{d} \sqrt{-c^2 f^2+g^2} \text{Log}\left[d \left(g+c^2 f x\right)+\sqrt{d} \sqrt{-c^2 f^2+g^2} \sqrt{d-c^2 d x^2}\right]+$$

$$b \sqrt{d-c^2 d x^2} \left(\frac{2 c g x \sqrt{\frac{-1+c x}{1+c x}}}{1-c x}+2 g \text{ArcCosh}[c x]+\right.$$

$$\frac{c f \sqrt{\frac{-1+c x}{1+c x}} \text{ArcCosh}[c x]^2}{1-c x}+\frac{1}{\sqrt{-c^2 f^2+g^2} \sqrt{\frac{-1+c x}{1+c x}} (1+c x)}$$

$$
\begin{aligned}
&2\,(-c\,f+g)\,(c\,f+g)\,\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]-\right.\\
&2\,i\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\\
&\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\right.\right.\\
&\left.\left.\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)\,\text{Log}\left[\frac{e^{-\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,(f+g\,x)}}\right]+\\
&\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.\\
&\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)\,\text{Log}\left[\frac{e^{\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,(f+g\,x)}}\right]-\\
&\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\\
&\text{Log}\left[\left((c\,f+g)\,\left(c\,f-g+i\,\sqrt{-c^2\,f^2+g^2}\right)\,\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.\\
&\left.\left(g\,\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\\
&\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\\
&\text{Log}\left[\left((c\,f+g)\,\left(-c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\right)\,\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.\\
&\left.\left(g\,\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]+i\,\left(\text{PolyLog}\left[2,\right.\right.\\
&\left(\left(c\,f-i\,\sqrt{-c^2\,f^2+g^2}\right)\,\left(c\,f+g-i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\\
&\left.\left(g\,\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\right.\\
&\left(\left(c\,f+i\,\sqrt{-c^2\,f^2+g^2}\right)\,\left(c\,f+g-i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\\
&\left.\left.\left.\left(g\,\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]\right)\right)
\end{aligned}
$$

Problem 57: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{d-c^2 d x^2}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)}{(f+g\,x)^2}\,dx$$

Optimal (type 4, 918 leaves, 38 steps):

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

Result (type 4, 1154 leaves):

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

$$\frac{1}{2\,g^2}\,b\,c\sqrt{-d\,(-1+c\,x)\,(1+c\,x)}$$

$$\left(-\frac{2\,g\,\text{ArcCosh}[c\,x]}{c\,f+c\,g\,x}+\frac{\text{ArcCosh}[c\,x]^2}{\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}+\frac{2\,\text{Log}\left[1+\frac{g\,x}{f}\right]}{\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}+\frac{1}{\sqrt{-c^2 f^2+g^2}\,\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}\right.$$

$$2\,c\,f\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-\right.$$

$$2\,\mathrm{i}\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(c\,f-g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c\,f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(-c\,f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c\,f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]+$$

$$\mathrm{i}\left(\text{PolyLog}\left[2,\left(\left(c\,f-\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.\right.$$

$$\left.\left(g\left(c\,f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\right.$$

$$\left(\left(c\,f+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/$$

$$\left.\left.\left(g\left(c f+g+i \sqrt{-c^2 f^2+g^2}\ \mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c x]\right]\right)\right]\right)\right)$$

Problem 61: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(d-c^2 d x^2\right)^{3/2} (a+b\,\mathrm{ArcCosh}[c x])}{f+g x}\,dx$$

Optimal (type 4, 1270 leaves, ? steps):

$$-\frac{a\,d\,(c\,f-g)\,(c\,f+g)\,\sqrt{d-c^2\,d\,x^2}}{g^3}+$$

$$\frac{b\,c\,d\,(c\,f-g)\,(c\,f+g)\,x\,\sqrt{d-c^2\,d\,x^2}}{g^3\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-\frac{b\,c^2\,d\,(c\,f-g)\,x^2\,\sqrt{d-c^2\,d\,x^2}}{4\,g^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+$$

$$\frac{a\,d\,\left(2+3\,c\,x-2\,c^2\,x^2\right)\,\sqrt{d-c^2\,d\,x^2}}{6\,g}+\frac{b\,c\,d\,x\,\left(-12-9\,c\,x+4\,c^2\,x^2\right)\,\sqrt{d-c^2\,d\,x^2}}{36\,g\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-$$

$$\frac{b\,d\,(c\,f-g)\,(c\,f+g)\,\sqrt{d-c^2\,d\,x^2}\,\text{ArcCosh}[c\,x]}{g^3}-\frac{a\,d\,\sqrt{d-c^2\,d\,x^2}\,\text{ArcCosh}[c\,x]}{2\,g\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+$$

$$\frac{b\,d\,\left(2+3\,c\,x-2\,c^2\,x^2\right)\,\sqrt{d-c^2\,d\,x^2}\,\text{ArcCosh}[c\,x]}{6\,g}-\frac{b\,d\,\sqrt{d-c^2\,d\,x^2}\,\text{ArcCosh}[c\,x]^2}{4\,g\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+$$

$$\frac{c\,d\,(c\,f-g)\,x\,\sqrt{d-c^2\,d\,x^2}\,(a+b\,\text{ArcCosh}[c\,x])}{2\,g^2}-\frac{d\,(c\,f-g)\,\sqrt{d-c^2\,d\,x^2}\,(a+b\,\text{ArcCosh}[c\,x])^2}{4\,b\,g^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+$$

$$\frac{c\,d\,(c\,f-g)\,(c\,f+g)\,x\,\sqrt{d-c^2\,d\,x^2}\,(a+b\,\text{ArcCosh}[c\,x])^2}{2\,b\,g^3\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+$$

$$\frac{d\,(c\,f-g)^2\,(c\,f+g)^2\,\sqrt{d-c^2\,d\,x^2}\,(a+b\,\text{ArcCosh}[c\,x])^2}{2\,b\,c\,g^4\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,(f+g\,x)}+$$

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

$$\frac{2\,a\,d\,(c\,f-g)^{3/2}\,(c\,f+g)^{3/2}\,\sqrt{d-c^2\,d\,x^2}\,\text{ArcTanh}\left[\frac{\sqrt{c\,f+g}\,\sqrt{1+c\,x}}{\sqrt{c\,f-g}\,\sqrt{-1+c\,x}}\right]}{g^4\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-$$

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

$$\left(g^4\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)+$$

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

$$\left(g^4\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)-$$

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

$$\left(g^4\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)+$$

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

$$\left(g^4\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)$$

Result (type 4, 3068 leaves):

$$\sqrt{-d\left(-1+c^2x^2\right)}\left(\frac{a\,d\left(-3c^2f^2+4g^2\right)}{3g^3}+\frac{a\,c^2 d\,f\,x}{2g^2}-\frac{a\,c^2 d\,x^2}{3g}\right)+$$

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

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

$$\frac{1}{2g^2}b\,d\sqrt{-d\,(-1+c\,x)\,(1+c\,x)}$$

$$\left(-\frac{2c\,g\,x}{\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}+2g\,\text{ArcCosh}[c\,x]-\frac{c\,f\,\text{ArcCosh}[c\,x]^2}{\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}+\frac{1}{\sqrt{-c^2f^2+g^2}\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}\right.$$

$$2(-c\,f+g)(c\,f+g)\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]-\right.$$

$$2\,\mathrm{i}\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c\,f+c\,g\,x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c\,f+c\,g\,x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(c\,f-g+\mathrm{i}\sqrt{-c^2f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c\,f+g+\mathrm{i}\sqrt{-c^2f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]\right)$$

$$\text{Log}\Big[\Big((c f+g)\left(-c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\Big[\frac{1}{2}\text{ArcCosh}[c x]\Big]\right)\Big)\Big/$$
$$\Big(g\left(c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\Big[\frac{1}{2}\text{ArcCosh}[c x]\Big]\right)\Big)\Big]+$$
$$\mathrm{i}\left(\text{PolyLog}\Big[2,\Big(\left(c f-\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-\mathrm{i}\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\Big[\frac{1}{2}\text{ArcCosh}[c x]\Big]\right)\Big)\Big/\right.$$
$$\Big(g\left(c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\Big[\frac{1}{2}\text{ArcCosh}[c x]\Big]\right)\Big)\Big]-\text{PolyLog}\Big[2,$$
$$\Big(\left(c f+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-\mathrm{i}\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\Big[\frac{1}{2}\text{ArcCosh}[c x]\Big]\right)\Big)\Big/$$
$$\left.\Big(g\left(c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\Big[\frac{1}{2}\text{ArcCosh}[c x]\Big]\right)\Big)\Big]\right)\Bigg)\Bigg)-$$

$$\frac{1}{72\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)}\,b\,d\sqrt{-d\,(-1+c x)\,(1+c x)}\,\Bigg(-\frac{1}{\sqrt{-c^2 f^2+g^2}}$$
$$9\left(-2\,\text{ArcCosh}[c x]\,\text{ArcTan}\Big[\frac{(c f+g)\,\text{Coth}\big[\frac{1}{2}\text{ArcCosh}[c x]\big]}{\sqrt{-c^2 f^2+g^2}}\Big]+\right.$$
$$2\,\mathrm{i}\,\text{ArcCos}\Big[-\frac{c f}{g}\Big]\,\text{ArcTan}\Big[\frac{(-c f+g)\,\text{Tanh}\big[\frac{1}{2}\text{ArcCosh}[c x]\big]}{\sqrt{-c^2 f^2+g^2}}\Big]-$$
$$\left(\text{ArcCos}\Big[-\frac{c f}{g}\Big]+2\left(\text{ArcTan}\Big[\frac{(c f+g)\,\text{Coth}\big[\frac{1}{2}\text{ArcCosh}[c x]\big]}{\sqrt{-c^2 f^2+g^2}}\Big]+\right.\right.$$
$$\left.\left.\text{ArcTan}\Big[\frac{(-c f+g)\,\text{Tanh}\big[\frac{1}{2}\text{ArcCosh}[c x]\big]}{\sqrt{-c^2 f^2+g^2}}\Big]\right)\right)\,\text{Log}\Big[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c f+c g x}}\Big]-$$
$$\left(\text{ArcCos}\Big[-\frac{c f}{g}\Big]-2\left(\text{ArcTan}\Big[\frac{(c f+g)\,\text{Coth}\big[\frac{1}{2}\text{ArcCosh}[c x]\big]}{\sqrt{-c^2 f^2+g^2}}\Big]+\text{ArcTan}\Big[\right.\right.$$
$$\left.\left.\frac{(-c f+g)\,\text{Tanh}\big[\frac{1}{2}\text{ArcCosh}[c x]\big]}{\sqrt{-c^2 f^2+g^2}}\Big]\right)\right)\,\text{Log}\Big[\frac{e^{\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c f+c g x}}\Big]+$$
$$\left(\text{ArcCos}\Big[-\frac{c f}{g}\Big]+2\,\text{ArcTan}\Big[\frac{(-c f+g)\,\text{Tanh}\big[\frac{1}{2}\text{ArcCosh}[c x]\big]}{\sqrt{-c^2 f^2+g^2}}\Big]\right)$$
$$\text{Log}\Big[\Big((c f+g)\left(c f-g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\Big[\frac{1}{2}\text{ArcCosh}[c x]\Big]\right)\Big)\Big/$$
$$\Big(g\left(c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\Big[\frac{1}{2}\text{ArcCosh}[c x]\Big]\right)\Big)\Big]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c f+g)\left(-c f+g+i\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]-i\left(\text{PolyLog}\left[2,\left(\left(c f-i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\left(\left(c f+i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]\right)\Bigg)-$$

$$\frac{1}{g^4}\Bigg(-18 c g\left(-4 c^2 f^2+g^2\right)x+18 g\left(-4 c^2 f^2+g^2\right)\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{ArcCosh}[c x]+$$

$$18 c f\left(2 c^2 f^2-g^2\right)\text{ArcCosh}[c x]^2-9 c f g^2\,\text{Cosh}[2\,\text{ArcCosh}[c x]]+$$

$$2 g^3\,\text{Cosh}[3\,\text{ArcCosh}[c x]]+\frac{1}{\sqrt{-c^2 f^2+g^2}}$$

$$9\left(8 c^4 f^4-8 c^2 f^2 g^2+g^4\right)\Bigg(2\,\text{ArcCosh}[c x]\,\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-$$

$$2 i\,\text{ArcCos}\left[-\frac{c f}{g}\right]\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c f+c g x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c f+c g x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\Big[\Big((c f+g)\left(c f-g+i\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\Big)\Big/\Big(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\Big)\Big]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\Big[\Big((c f+g)\left(-c f+g+i\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\Big)\Big/\Big(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\Big)\Big]+i\,\Big(\text{PolyLog}\Big[2,$$

$$\Big(\left(c f-i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\Big)\Big/\Big(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\Big)\Big]-\text{PolyLog}\Big[2,$$

$$\Big(\left(c f+i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\Big)\Big/\Big(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\Big)\Big]\Big)\Big)+$$

$$18 c f g^2\,\text{ArcCosh}[c x]\,\text{Sinh}[2\,\text{ArcCosh}[c x]]-6 g^3\,\text{ArcCosh}[c x]\,\text{Sinh}[3\,\text{ArcCosh}[c x]]\Big)\Big)$$

Problem 65: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(d-c^2 d x^2)^{5/2}\,(a+b\,\text{ArcCosh}[c x])}{f+g x}\,dx$$

Optimal (type 4, 1744 leaves, 38 steps):

$$\frac{2 b c d^2 x\sqrt{d-c^2 d x^2}}{15 g\sqrt{-1+c x}\,\sqrt{1+c x}}+\frac{b c d^2\left(c^2 f^2-2 g^2\right) x\sqrt{d-c^2 d x^2}}{3 g^3\sqrt{-1+c x}\,\sqrt{1+c x}}-\frac{b c d^2\left(c^2 f^2-g^2\right)^2 x\sqrt{d-c^2 d x^2}}{g^5\sqrt{-1+c x}\,\sqrt{1+c x}}-$$

$$\frac{b c^3 d^2 f x^2\sqrt{d-c^2 d x^2}}{16 g^2\sqrt{-1+c x}\,\sqrt{1+c x}}+\frac{b c^3 d^2 f\left(c^2 f^2-2 g^2\right) x^2\sqrt{d-c^2 d x^2}}{4 g^4\sqrt{-1+c x}\,\sqrt{1+c x}}+$$

$$\frac{b c^3 d^2 x^3\sqrt{d-c^2 d x^2}}{45 g\sqrt{-1+c x}\,\sqrt{1+c x}}-\frac{b c^3 d^2\left(c^2 f^2-2 g^2\right) x^3\sqrt{d-c^2 d x^2}}{9 g^3\sqrt{-1+c x}\,\sqrt{1+c x}}+\frac{b c^5 d^2 f x^4\sqrt{d-c^2 d x^2}}{16 g^2\sqrt{-1+c x}\,\sqrt{1+c x}}-$$

$$\frac{b c^5 d^2 x^5\sqrt{d-c^2 d x^2}}{25 g\sqrt{-1+c x}\,\sqrt{1+c x}}+\frac{a d^2\left(c^2 f^2-g^2\right)^2\left(1-c^2 x^2\right)\sqrt{d-c^2 d x^2}}{g^5\,(1-c x)\,(1+c x)}+$$

$$\frac{b d^2\left(c^2 f^2-g^2\right)^2\sqrt{d-c^2 d x^2}\,\text{ArcCosh}[c x]}{g^5}+\frac{c^2 d^2 f x\sqrt{d-c^2 d x^2}\,(a+b\,\text{ArcCosh}[c x])}{8 g^2}-$$

$$\frac{c^2 d^2 f \left(c^2 f^2-2 g^2\right) x \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)}{2 g^4}-$$
$$\frac{c^4 d^2 f x^3 \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)}{4 g^2}-$$
$$\frac{2 d^2 (1-c x) (1+c x) \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)}{15 g}-$$
$$\frac{d^2 \left(c^2 f^2-2 g^2\right) (1-c x) (1+c x) \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)}{3 g^3}-$$
$$\frac{c^2 d^2 x^2 (1-c x) (1+c x) \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)}{5 g}+$$
$$\frac{c d^2 f \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)^2}{16 b g^2 \sqrt{-1+c x} \sqrt{1+c x}}+\frac{c d^2 f \left(c^2 f^2-2 g^2\right) \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)^2}{4 b g^4 \sqrt{-1+c x} \sqrt{1+c x}}-$$
$$\frac{c d^2 \left(c^2 f^2-g^2\right)^2 x \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)^2}{2 b g^5 \sqrt{-1+c x} \sqrt{1+c x}}-$$
$$\frac{d^2 \left(c^2 f^2-g^2\right)^3 \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)^2}{2 b c g^6 \sqrt{-1+c x} \sqrt{1+c x} (f+g x)}-$$
$$\frac{d^2 \left(c^2 f^2-g^2\right)^2 \left(1-c^2 x^2\right) \sqrt{d-c^2 d x^2} \left(a+b \text{ArcCosh}[c x]\right)^2}{2 b c g^4 \sqrt{-1+c x} \sqrt{1+c x} (f+g x)}-$$
$$\left(a d^2 \left(c^2 f^2-g^2\right)^{5/2} \sqrt{-1+c^2 x^2} \sqrt{d-c^2 d x^2} \text{ArcTanh}\left[\frac{g+c^2 f x}{\sqrt{c^2 f^2-g^2} \sqrt{-1+c^2 x^2}}\right]\right) \Big/$$
$$\left(g^6 (1-c x) (1+c x)\right)+\frac{b d^2 \left(c^2 f^2-g^2\right)^{5/2} \sqrt{d-c^2 d x^2} \text{ArcCosh}[c x] \text{Log}\left[1+\frac{e^{\text{ArcCosh}[c x]} g}{c f-\sqrt{c^2 f^2-g^2}}\right]}{g^6 \sqrt{-1+c x} \sqrt{1+c x}}-$$
$$\frac{b d^2 \left(c^2 f^2-g^2\right)^{5/2} \sqrt{d-c^2 d x^2} \text{ArcCosh}[c x] \text{Log}\left[1+\frac{e^{\text{ArcCosh}[c x]} g}{c f+\sqrt{c^2 f^2-g^2}}\right]}{g^6 \sqrt{-1+c x} \sqrt{1+c x}}+$$
$$\frac{b d^2 \left(c^2 f^2-g^2\right)^{5/2} \sqrt{d-c^2 d x^2} \text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c x]} g}{c f-\sqrt{c^2 f^2-g^2}}\right]}{g^6 \sqrt{-1+c x} \sqrt{1+c x}}-$$
$$\frac{b d^2 \left(c^2 f^2-g^2\right)^{5/2} \sqrt{d-c^2 d x^2} \text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c x]} g}{c f+\sqrt{c^2 f^2-g^2}}\right]}{g^6 \sqrt{-1+c x} \sqrt{1+c x}}$$

Result (type 4, 7300 leaves) :

$$\sqrt{-d \left(-1+c^2 x^2\right)} \left(\frac{a d^2 \left(15 c^4 f^4-35 c^2 f^2 g^2+23 g^4\right)}{15 g^5}-\right.$$

$$\frac{a c^2 d^2 f \left(4 c^2 f^2-9 g^2\right) x}{8 g^4}-\frac{a c^2 d^2 \left(-5 c^2 f^2+11 g^2\right) x^2}{15 g^3}-\frac{a c^4 d^2 f x^3}{4 g^2}+\frac{a c^4 d^2 x^4}{5 g}\Bigg)-$$

$$\frac{a c d^{5/2} f \left(8 c^4 f^4-20 c^2 f^2 g^2+15 g^4\right) \text{ArcTan}\left[\frac{c x \sqrt{-d \left(-1+c^2 x^2\right)}}{\sqrt{d} \left(-1+c^2 x^2\right)}\right]}{8 g^6}+$$

$$\frac{a d^{5/2} \left(-c^2 f^2+g^2\right)^{5/2} \text{Log}[f+g x]}{g^6}-\frac{1}{g^6}$$

$$a d^{5/2} \left(-c^2 f^2+g^2\right)^{5/2} \text{Log}\left[d g+c^2 d f x+\sqrt{d} \sqrt{-c^2 f^2+g^2} \sqrt{-d \left(-1+c^2 x^2\right)}\right]+$$

$$\frac{1}{2 g^2} b d^2 \sqrt{-d (-1+c x) (1+c x)}$$

$$\Bigg(-\frac{2 c g x}{\sqrt{\frac{-1+c x}{1+c x}} (1+c x)}+2 g \text{ArcCosh}[c x]-\frac{c f \text{ArcCosh}[c x]^2}{\sqrt{\frac{-1+c x}{1+c x}} (1+c x)}+\frac{1}{\sqrt{-c^2 f^2+g^2} \sqrt{\frac{-1+c x}{1+c x}} (1+c x)}$$

$$2 (-c f+g) (c f+g) \Bigg(2 \text{ArcCosh}[c x] \text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-$$

$$2 i \text{ArcCos}\left[-\frac{c f}{g}\right] \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+$$

$$\Bigg(\text{ArcCos}\left[-\frac{c f}{g}\right]+2 \Bigg(\text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\Big[$$

$$\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\Big]\Bigg)\Bigg) \text{Log}\left[\frac{e^{-\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]+$$

$$\Bigg(\text{ArcCos}\left[-\frac{c f}{g}\right]-2 \Bigg(\text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\Big[$$

$$\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\Big]\Bigg)\Bigg) \text{Log}\left[\frac{e^{\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2 \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\Bigg[\left((c f+g) \left(c f-g+i \sqrt{-c^2 f^2+g^2}\right) \left(-1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\Big/$$

$$\left(g \left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\Bigg]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2 \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c f+g)\left(-c f+g+i \sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right]+$$

$$i\left(\text{PolyLog}\left[2,\left(\left(c f-i \sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\left(\left(c f+i \sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)\right)\right]\right)\Bigg)-$$

$$\frac{1}{36 \sqrt{\frac{-1+c x}{1+c x}}(1+c x)} b d^2 \sqrt{-d(-1+c x)(1+c x)}\left(-\frac{1}{\sqrt{-c^2 f^2+g^2}}\right.$$

$$9\left(-2 \text{ArcCosh}[c x] \text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\right.$$

$$2 i \text{ArcCos}\left[-\frac{c f}{g}\right] \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right) \text{Log}\left[\frac{e^{-\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right) \text{Log}\left[\frac{e^{\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2 \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\Big[\Big(\big(c\,f+g\big)\,\Big(c\,f-g+i\,\sqrt{-c^2\,f^2+g^2}\Big)\,\Big(-1+\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\Big]\Big)\Big)\Big/$$
$$\Big(g\,\Big(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\,\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\Big]\Big)\Big)\Big]+$$
$$\left(\text{ArcCos}\Big[-\frac{c\,f}{g}\Big]-2\,\text{ArcTan}\Big[\frac{\big(-c\,f+g\big)\,\text{Tanh}\big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\big]}{\sqrt{-c^2\,f^2+g^2}}\Big]\right)$$
$$\text{Log}\Big[\Big(\big(c\,f+g\big)\,\Big(-c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\Big)\,\Big(1+\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\Big]\Big)\Big)\Big/$$
$$\Big(g\,\Big(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\,\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\Big]\Big)\Big)\Big]-i\,\Big(\text{PolyLog}\Big[2,$$
$$\Big(\Big(c\,f-i\,\sqrt{-c^2\,f^2+g^2}\Big)\,\Big(c\,f+g-i\,\sqrt{-c^2\,f^2+g^2}\,\,\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\Big]\Big)\Big)\Big/$$
$$\Big(g\,\Big(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\,\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\Big]\Big)\Big)\Big]-\text{PolyLog}\Big[2,$$
$$\Big(\Big(c\,f+i\,\sqrt{-c^2\,f^2+g^2}\Big)\,\Big(c\,f+g-i\,\sqrt{-c^2\,f^2+g^2}\,\,\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\Big]\Big)\Big)\Big/$$
$$\Big(g\,\Big(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\,\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\Big]\Big)\Big)\Big]\Big)\Big)\Big)-$$

$$\frac{1}{g^4}\left(-18\,c\,g\,\big(-4\,c^2\,f^2+g^2\big)\,x+18\,g\,\big(-4\,c^2\,f^2+g^2\big)\,\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\big(1+c\,x\big)\,\text{ArcCosh}[c\,x]+\right.$$
$$18\,c\,f\,\big(2\,c^2\,f^2-g^2\big)\,\text{ArcCosh}[c\,x]^2-9\,c\,f\,g^2\,\text{Cosh}[2\,\text{ArcCosh}[c\,x]]+$$
$$2\,g^3\,\text{Cosh}[3\,\text{ArcCosh}[c\,x]]+\frac{1}{\sqrt{-c^2\,f^2+g^2}}$$
$$9\,\big(8\,c^4\,f^4-8\,c^2\,f^2\,g^2+g^4\big)\,\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\Big[\frac{\big(c\,f+g\big)\,\text{Coth}\big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\big]}{\sqrt{-c^2\,f^2+g^2}}\Big]-\right.$$
$$2\,i\,\text{ArcCos}\Big[-\frac{c\,f}{g}\Big]\,\text{ArcTan}\Big[\frac{\big(-c\,f+g\big)\,\text{Tanh}\big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\big]}{\sqrt{-c^2\,f^2+g^2}}\Big]+$$
$$\left(\text{ArcCos}\Big[-\frac{c\,f}{g}\Big]+2\,\left(\text{ArcTan}\Big[\frac{\big(c\,f+g\big)\,\text{Coth}\big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\big]}{\sqrt{-c^2\,f^2+g^2}}\Big]+\text{ArcTan}\Big[\right.\right.$$
$$\left.\left.\frac{\big(-c\,f+g\big)\,\text{Tanh}\big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\big]}{\sqrt{-c^2\,f^2+g^2}}\Big]\right)\right)\,\text{Log}\Big[\frac{e^{-\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\Big]+$$
$$\left(\text{ArcCos}\Big[-\frac{c\,f}{g}\Big]-2\,\left(\text{ArcTan}\Big[\frac{\big(c\,f+g\big)\,\text{Coth}\big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\big]}{\sqrt{-c^2\,f^2+g^2}}\Big]+\text{ArcTan}\Big[\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)\,\mathrm{Log}\left[\frac{e^{\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]-$$

$$\left(\mathrm{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\mathrm{ArcTan}\left[\frac{(-c\,f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)$$

$$\mathrm{Log}\left[\left((c\,f+g)\,\left(c\,f-g+i\,\sqrt{-c^2\,f^2+g^2}\right)\,\left(-1+\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\,\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\mathrm{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\mathrm{ArcTan}\left[\frac{(-c\,f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)$$

$$\mathrm{Log}\left[\left((c\,f+g)\,\left(-c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\right)\,\left(1+\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\,\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]\right)\right)\right]+i\,\Big(\mathrm{PolyLog}\Big[2,$$

$$\left(\left(c\,f-i\,\sqrt{-c^2\,f^2+g^2}\right)\,\left(c\,f+g-i\,\sqrt{-c^2\,f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]\right)\right)\Big/$$

$$\left(g\,\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]\right)\right)\Big]-\mathrm{PolyLog}\Big[2,$$

$$\left(\left(c\,f+i\,\sqrt{-c^2\,f^2+g^2}\right)\,\left(c\,f+g-i\,\sqrt{-c^2\,f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]\right)\right)\Big/$$

$$\left.\left.\left(g\,\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]\right)\right)\Big]\right)\right)+$$

$$\left.\left.18\,c\,f\,g^2\,\mathrm{ArcCosh}[c\,x]\,\mathrm{Sinh}[2\,\mathrm{ArcCosh}[c\,x]]-6\,g^3\,\mathrm{ArcCosh}[c\,x]\,\mathrm{Sinh}[3\,\mathrm{ArcCosh}[c\,x]]\right)\right)-$$

$$b\,d^2\left(\frac{1}{32\,g^2\,\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}\,\sqrt{-d\,(-1+c\,x)\,(1+c\,x)}\right.$$

$$\left(-2\,c\,g\,x+2\,g\,\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\mathrm{ArcCosh}[c\,x]-c\,f\,\mathrm{ArcCosh}[c\,x]^2+\right.$$

$$\frac{1}{\sqrt{-c^2\,f^2+g^2}}\,\left(-2\,c^2\,f^2+g^2\right)\,\left(2\,\mathrm{ArcCosh}[c\,x]\,\mathrm{ArcTan}\left[\frac{(c\,f+g)\,\mathrm{Coth}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]-\right.$$

$$2\,i\,\mathrm{ArcCos}\left[-\frac{c\,f}{g}\right]\,\mathrm{ArcTan}\left[\frac{(-c\,f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c f+c g x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c f+c g x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c f+g)\left(c f-g+i\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c f+g)\left(-c f+g+i\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]+i\left(\text{PolyLog}\left[2,\right.\right.$$

$$\left(\left(c f-i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/$$

$$\left.\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\right.$$

$$\left(\left(c f+i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/$$

$$\left.\left.\left.\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]\right)\right)+$$

$$\frac{1}{16\sqrt{-c^2 f^2+g^2}\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)}\sqrt{-d\,(-1+c x)\,(1+c x)}$$

$$\left(-2\,\text{ArcCosh}[c x]\,\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)\,\text{Log}\left[\frac{e^{-\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)\,\text{Log}\left[\frac{e^{\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(c\,f-g+i\sqrt{-c^2\,f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(g\left(c\,f+g+i\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(-c\,f+g+i\sqrt{-c^2\,f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(g\left(c\,f+g+i\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$i\left(\text{PolyLog}\left[2,\left(\left(c\,f-i\sqrt{-c^2\,f^2+g^2}\right)\left(c\,f+g-i\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(g\left(c\,f+g+i\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\right.$$

$$\left.\text{PolyLog}\left[2,\left(\left(c\,f+i\sqrt{-c^2\,f^2+g^2}\right)\left(c\,f+g-i\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(g\left(c\,f+g+i\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]\right)\Bigg)+$$

$$\frac{1}{144\,g^4\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}\sqrt{-d\,(-1+c\,x)\,(1+c\,x)}\,\Big(-18\,c\,g\,\left(-4\,c^2\,f^2+g^2\right)\,x+$$

$$18\,g\left(-4c^2f^2+g^2\right)\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\text{ArcCosh}[c\,x]+$$

$$18\,c\,f\left(2c^2f^2-g^2\right)\text{ArcCosh}[c\,x]^2-9\,c\,f\,g^2\,\text{Cosh}[2\,\text{ArcCosh}[c\,x]]+$$

$$2\,g^3\,\text{Cosh}[3\,\text{ArcCosh}[c\,x]]+\frac{1}{\sqrt{-c^2f^2+g^2}}$$

$$9\left(8c^4f^4-8c^2f^2g^2+g^4\right)\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]-\right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(c\,f-g+i\sqrt{-c^2f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c\,f+g+i\sqrt{-c^2f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(-c\,f+g+i\sqrt{-c^2f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c\,f+g+i\sqrt{-c^2f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]+i\left(\text{PolyLog}\left[2,\right.\right.$$

$$\left(\left(c\,f-i\sqrt{-c^2f^2+g^2}\right)\left(c\,f+g-i\sqrt{-c^2f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/$$

$$\left.\left(g\left(c\,f+g+i\sqrt{-c^2f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\right.$$

$$\left(\left(c f + i \sqrt{-c^2 f^2 + g^2}\right) \left(c f + g - i \sqrt{-c^2 f^2 + g^2} \operatorname{Tanh}\left[\frac{1}{2} \operatorname{ArcCosh}[c x]\right]\right)\right) \Big/$$

$$\left(g \left(c f + g + i \sqrt{-c^2 f^2 + g^2} \operatorname{Tanh}\left[\frac{1}{2} \operatorname{ArcCosh}[c x]\right]\right)\right)\Bigg]\Bigg)\Bigg) +$$

$$18 c f g^2 \operatorname{ArcCosh}[c x] \operatorname{Sinh}[2 \operatorname{ArcCosh}[c x]] - 6 g^3 \operatorname{ArcCosh}[c x] \operatorname{Sinh}[3 \operatorname{ArcCosh}[c x]]\Bigg) -$$

$$\frac{1}{32 \sqrt{\frac{-1+c x}{1+c x}} (1 + c x)} \sqrt{-d (-1 + c x) (1 + c x)}$$

$$\left(-\frac{2 c \left(16 c^4 f^4 - 12 c^2 f^2 g^2 + g^4\right) x}{g^5} + \right.$$

$$\frac{32 c^4 f^4 \sqrt{\frac{-1+c x}{1+c x}} (1 + c x) \operatorname{ArcCosh}[c x]}{g^5} -$$

$$\frac{24 c^2 f^2 \sqrt{\frac{-1+c x}{1+c x}} (1 + c x) \operatorname{ArcCosh}[c x]}{g^3} +$$

$$\frac{2 \sqrt{\frac{-1+c x}{1+c x}} (1 + c x) \operatorname{ArcCosh}[c x]}{g} - \frac{16 c^5 f^5 \operatorname{ArcCosh}[c x]^2}{g^6} +$$

$$\frac{16 c^3 f^3 \operatorname{ArcCosh}[c x]^2}{g^4} - \frac{3 c f \operatorname{ArcCosh}[c x]^2}{g^2} -$$

$$\frac{2 c f \left(-2 c^2 f^2 + g^2\right) \operatorname{Cosh}[2 \operatorname{ArcCosh}[c x]]}{g^4} -$$

$$\frac{8 c^2 f^2 \operatorname{Cosh}[3 \operatorname{ArcCosh}[c x]]}{9 g^3} + \frac{2 \operatorname{Cosh}[3 \operatorname{ArcCosh}[c x]]}{9 g} +$$

$$\frac{c f \operatorname{Cosh}[4 \operatorname{ArcCosh}[c x]]}{4 g^2} - \frac{2 \operatorname{Cosh}[5 \operatorname{ArcCosh}[c x]]}{25 g} +$$

$$\frac{1}{g^6 \sqrt{-c^2 f^2 + g^2}} \left(-2 c^2 f^2 + g^2\right) \left(16 c^4 f^4 - 16 c^2 f^2 g^2 + g^4\right)$$

$$\left(2 \operatorname{ArcCosh}[c x] \operatorname{ArcTan}\left[\frac{(c f + g) \operatorname{Coth}\left[\frac{1}{2} \operatorname{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2 + g^2}}\right] - \right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)\,\text{Log}\left[\frac{e^{-\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)\,\text{Log}\left[\frac{e^{\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(c\,f-g+i\,\sqrt{-c^2\,f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(-c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]+i\left(\text{PolyLog}\left[2,\right.\right.$$

$$\left(\left(c\,f-i\,\sqrt{-c^2\,f^2+g^2}\right)\left(c\,f+g-i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/$$

$$\left.\left(g\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\right.$$

$$\left(\left(c\,f+i\,\sqrt{-c^2\,f^2+g^2}\right)\left(c\,f+g-i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\Big/$$

$$\left.\left.\left(g\left(c\,f+g+i\,\sqrt{-c^2\,f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right)\right]\right)-$$

$$\frac{8\,c^3\,f^3\,\text{ArcCosh}[c\,x]\,\text{Sinh}[2\,\text{ArcCosh}[c\,x]]}{g^4}+\frac{4\,c\,f\,\text{ArcCosh}[c\,x]\,\text{Sinh}[2\,\text{ArcCosh}[c\,x]]}{g^2}+$$

$$\frac{8\,c^2\,f^2\,\text{ArcCosh}[c\,x]\,\text{Sinh}[3\,\text{ArcCosh}[c\,x]]}{3\,g^3}-$$

$$\frac{2\,\text{ArcCosh}[c\,x]\,\text{Sinh}[3\,\text{ArcCosh}[c\,x]]}{3\,g}-$$

$$\frac{c\,f\,\text{ArcCosh}[c\,x]\,\text{Sinh}[4\,\text{ArcCosh}[c\,x]]}{g^2}+$$

$$\left.\left.\frac{2\,\text{ArcCosh}[c\,x]\,\text{Sinh}[5\,\text{ArcCosh}[c\,x]]}{5\,g}\right)\right)$$

Problem 69: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{a+b\,\text{ArcCosh}[c\,x]}{(f+g\,x)\,\sqrt{d-c^2\,d\,x^2}}\,dx$$

Optimal (type 4, 365 leaves, 10 steps):

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

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

$$\frac{b\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f-\sqrt{c^2\,f^2-g^2}}\right]}{\sqrt{c^2\,f^2-g^2}\,\sqrt{d-c^2\,d\,x^2}}-\frac{b\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f+\sqrt{c^2\,f^2-g^2}}\right]}{\sqrt{c^2\,f^2-g^2}\,\sqrt{d-c^2\,d\,x^2}}$$

Result (type 4, 932 leaves):

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

$$\frac{1}{\sqrt{d-c^2\,d\,x^2}}\,b\,\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]-\right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\right.\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)\,\text{Log}\left[\frac{e^{-\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,(f+g\,x)}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c (f+g x)}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c f+g)\left(c f-g+i\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c f+g)\left(-c f+g+i\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]+$$

$$i\left(\text{PolyLog}\left[2,\left(\left(c f-i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]-\right.$$

$$\left.\text{PolyLog}\left[2,\left(\left(c f+i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]\right)\Bigg)\Bigg)$$

Problem 70: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{a+b\,\text{ArcCosh}[c x]}{(f+g x)^2\sqrt{d-c^2 d x^2}}\,dx$$

Optimal (type 4, 523 leaves, 13 steps):

$$-\frac{g\sqrt{-1+c x}\sqrt{-\frac{1-c x}{1+c x}}\,(1+c x)^{3/2}\,(a+b\,\text{ArcCosh}[c x])}{(c^2 f^2-g^2)\,(f+g x)\,\sqrt{d-c^2 d x^2}}+$$

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

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

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

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

Result (type 4, 1115 leaves):

$$-\frac{a g\sqrt{d-c^2 d x^2}}{d\,(-c^2 f^2+g^2)\,(f+g x)}-\frac{a c^2 f\,\text{Log}[f+g x]}{\sqrt{d}\,(-c^2 f^2+g^2)^{3/2}}-$$

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

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

$$\frac{1}{(-c^2 f^2+g^2)^{3/2}}\,c f\left(2\,\text{ArcCosh}[c x]\,\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-\right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c f}{g}\right]\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c\,(f+g x)}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,(f+g\,x)}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(c\,f-g+i\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\left((c\,f+g)\left(-c\,f+g+i\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]+$$

$$i\left(\text{PolyLog}\left[2,\left(\left(c\,f-i\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-i\sqrt{-c^2 f^2+g^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\right.\right.$$

$$\left.\left.\left(\left(c\,f+i\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-i\sqrt{-c^2 f^2+g^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\Big/\left(g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\;\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right)\right]\right)\Bigg)$$

Problem 74: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{a+b\,\text{ArcCosh}[c\,x]}{(f+g\,x)\left(d-c^2 d\,x^2\right)^{3/2}}\,dx$$

Optimal (type 4, 773 leaves, 25 steps):

$$-\frac{(1-c x)\,(a+b\,\text{ArcCosh}[c x])}{2 d\,(c f-g)\,\sqrt{d-c^2 d x^2}}+\frac{(1+c x)\,(a+b\,\text{ArcCosh}[c x])}{2 d\,(c f+g)\,\sqrt{d-c^2 d x^2}}-$$

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

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

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

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

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

Result (type 4, 1386 leaves):

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

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

$$\frac{1}{d} b\left(-\frac{\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{ArcCosh}[c x]\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{2\,(c f+g)\sqrt{-d\,(-1+c x)\,(1+c x)}}+\right.$$

$$\frac{\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{Log}\left[\text{Cosh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]}{(c f-g)\sqrt{-d\,(-1+c x)\,(1+c x)}}+$$

$$\frac{\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{Log}\left[\text{Sinh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]}{(c f+g)\sqrt{-d\,(-1+c x)\,(1+c x)}}+$$

$$\frac{1}{\left(-c f+g\right)\left(c f+g\right)\sqrt{-c^2 f^2+g^2}\sqrt{-d\left(-1+c x\right)\left(1+c x\right)}}$$

$$g^2\sqrt{\frac{-1+c x}{1+c x}}\left(1+c x\right)\left(2\,\text{ArcCosh}[c x]\,\text{ArcTan}\left[\frac{\left(c f+g\right)\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-\right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c f}{g}\right]\text{ArcTan}\left[\frac{\left(-c f+g\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\,i\left(-i\,\text{ArcTan}\left[\frac{\left(c f+g\right)\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-i\right.\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{\left(-c f+g\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c f+c g x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\,i\left(-i\,\text{ArcTan}\left[\frac{\left(c f+g\right)\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-i\right.\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{\left(-c f+g\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c f+c g x}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\,\text{ArcTan}\left[\frac{\left(-c f+g\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[1-\left(\left(c f-i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]+$$

$$\left(-\text{ArcCos}\left[-\frac{c f}{g}\right]-2\,\text{ArcTan}\left[\frac{\left(-c f+g\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[1-\left(\left(c f+i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\right.$$

$$\left.\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]+$$

$$i\left(\text{PolyLog}\left[2,\left(\left(c f-i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/\right.\right.$$

$$\left.\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]-\text{PolyLog}\left[2,\right.$$

$$\left(\left(c f+i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\Big/$$

$$\left.\left.\left.\left(g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)\right)\right]\right)\right)-$$

$$\left.\frac{\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\left(1+c\,x\right)\,\text{ArcCosh}[c\,x]\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{2\,\left(c\,f-g\right)\,\sqrt{-d\,\left(-1+c\,x\right)\,\left(1+c\,x\right)}}\right)$$

Problem 76: Attempted integration timed out after 120 seconds.

$$\int\frac{\left(a+b\,\text{ArcCosh}[c\,x]\right)^2\,\text{Log}\left[h\,\left(f+g\,x\right)^m\right]}{\sqrt{1-c^2\,x^2}}\,dx$$

Optimal (type 4, 774 leaves, 14 steps):

$$\frac{m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)^4}{12\,b^2\,c\,\sqrt{1-c^2\,x^2}}-$$
$$\frac{m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)^3\,\text{Log}\left[1+\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f-\sqrt{c^2\,f^2-g^2}}\right]}{3\,b\,c\,\sqrt{1-c^2\,x^2}}-$$
$$\frac{m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)^3\,\text{Log}\left[1+\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f+\sqrt{c^2\,f^2-g^2}}\right]}{3\,b\,c\,\sqrt{1-c^2\,x^2}}+$$
$$\frac{\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)^3\,\text{Log}\left[h\,\left(f+g\,x\right)^m\right]}{3\,b\,c\,\sqrt{1-c^2\,x^2}}-\frac{1}{c\,\sqrt{1-c^2\,x^2}}$$
$$m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)^2\,\text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f-\sqrt{c^2\,f^2-g^2}}\right]-\frac{1}{c\,\sqrt{1-c^2\,x^2}}$$
$$m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)^2\,\text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f+\sqrt{c^2\,f^2-g^2}}\right]+\frac{1}{c\,\sqrt{1-c^2\,x^2}}$$
$$2\,b\,m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)\,\text{PolyLog}\left[3,-\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f-\sqrt{c^2\,f^2-g^2}}\right]+$$
$$\frac{1}{c\,\sqrt{1-c^2\,x^2}}2\,b\,m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(a+b\,\text{ArcCosh}[c\,x]\right)\,\text{PolyLog}\left[3,-\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f+\sqrt{c^2\,f^2-g^2}}\right]-$$
$$\frac{2\,b^2\,m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{PolyLog}\left[4,-\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f-\sqrt{c^2\,f^2-g^2}}\right]}{c\,\sqrt{1-c^2\,x^2}}-$$
$$\frac{2\,b^2\,m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{PolyLog}\left[4,-\frac{e^{\text{ArcCosh}[c\,x]}\,g}{c\,f+\sqrt{c^2\,f^2-g^2}}\right]}{c\,\sqrt{1-c^2\,x^2}}$$

Result (type 1, 1 leaves):

???

Problem 77: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b\,\text{ArcCosh}[c\,x])\,\text{Log}\left[h\,(f+g\,x)^m\right]}{\sqrt{1-c^2\,x^2}}\,dx$$

Optimal (type 4, 600 leaves, 12 steps):

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

Result (type 1, 1 leaves):

???

Problem 78: Attempted integration timed out after 120 seconds.

$$\int \frac{\text{Log}\left[h\,(f+g\,x)^m\right]}{\sqrt{1-c^2\,x^2}}\,dx$$

Optimal (type 4, 237 leaves, 9 steps):

$$\frac{i\, m\, \text{ArcSin}[c\, x]^2}{2\, c} - \frac{m\, \text{ArcSin}[c\, x]\, \text{Log}\left[1 - \frac{i\, e^{i\, \text{ArcSin}[c\, x]}\, g}{c\, f - \sqrt{c^2\, f^2 - g^2}}\right]}{c} - \frac{m\, \text{ArcSin}[c\, x]\, \text{Log}\left[1 - \frac{i\, e^{i\, \text{ArcSin}[c\, x]}\, g}{c\, f + \sqrt{c^2\, f^2 - g^2}}\right]}{c} + \frac{\text{ArcSin}[c\, x]\, \text{Log}\left[h\, (f + g\, x)^m\right]}{c} + \frac{i\, m\, \text{PolyLog}\left[2, \frac{i\, e^{i\, \text{ArcSin}[c\, x]}\, g}{c\, f - \sqrt{c^2\, f^2 - g^2}}\right]}{c} + \frac{i\, m\, \text{PolyLog}\left[2, \frac{i\, e^{i\, \text{ArcSin}[c\, x]}\, g}{c\, f + \sqrt{c^2\, f^2 - g^2}}\right]}{c}$$

Result (type 1, 1 leaves):

???

Problem 84: Result unnecessarily involves imaginary or complex numbers.

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

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

$$-\frac{1}{2}\, \text{ArcCosh}[a + b\, x]^2 + \text{ArcCosh}[a + b\, x]\, \text{Log}\left[1 - \frac{e^{\text{ArcCosh}[a+b\, x]}}{a - \sqrt{-1 + a^2}}\right] + \text{ArcCosh}[a + b\, x]\, \text{Log}\left[1 - \frac{e^{\text{ArcCosh}[a+b\, x]}}{a + \sqrt{-1 + a^2}}\right] + \text{PolyLog}\left[2, \frac{e^{\text{ArcCosh}[a+b\, x]}}{a - \sqrt{-1 + a^2}}\right] + \text{PolyLog}\left[2, \frac{e^{\text{ArcCosh}[a+b\, x]}}{a + \sqrt{-1 + a^2}}\right]$$

Result (type 4, 221 leaves):

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

Problem 85: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 64 leaves, 4 steps):

$$-\frac{\text{ArcCosh}[a + b\, x]}{x} - \frac{2\, b\, \text{ArcTan}\left[\frac{\sqrt{1-a}\, \sqrt{1+a+b\, x}}{\sqrt{1+a}\, \sqrt{-1+a+b\, x}}\right]}{\sqrt{1 - a^2}}$$

Result (type 3, 83 leaves):

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

Problem 86: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 106 leaves, 5 steps):

$$\frac{b\,\sqrt{-1+a+b\,x}\,\sqrt{1+a+b\,x}}{2\left(1-a^2\right)x}-\frac{\text{ArcCosh}[a+b\,x]}{2\,x^2}-\frac{a\,b^2\,\text{ArcTan}\left[\frac{\sqrt{1-a}\,\sqrt{1+a+b\,x}}{\sqrt{1+a}\,\sqrt{-1+a+b\,x}}\right]}{\left(1-a^2\right)^{3/2}}$$

Result (type 3, 136 leaves):

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

Problem 87: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcCosh}[a+b\,x]}{x^4}\,dx$$

Optimal (type 3, 154 leaves, 7 steps):

$$\frac{b\,\sqrt{-1+a+b\,x}\,\sqrt{1+a+b\,x}}{6\left(1-a^2\right)x^2}+\frac{a\,b^2\,\sqrt{-1+a+b\,x}\,\sqrt{1+a+b\,x}}{2\left(1-a^2\right)^2x}-\frac{\text{ArcCosh}[a+b\,x]}{3\,x^3}-\frac{\left(1+2\,a^2\right)b^3\,\text{ArcTan}\left[\frac{\sqrt{1-a}\,\sqrt{1+a+b\,x}}{\sqrt{1+a}\,\sqrt{-1+a+b\,x}}\right]}{3\left(1-a^2\right)^{5/2}}$$

Result (type 3, 162 leaves):

$$\frac{1}{6}\left(\frac{b\sqrt{-1+a+b\,x}\;\sqrt{1+a+b\,x}\;\left(1-a^2+3\,a\,b\,x\right)}{\left(-1+a^2\right)^2 x^2}-\frac{2\,\text{ArcCosh}[a+b\,x]}{x^3}-\frac{\mathrm{i}\,\left(1+2\,a^2\right)\,b^3\,\text{Log}\left[\frac{12\,\left(1-a^2\right)^{3/2}\left(-\mathrm{i}+\mathrm{i}\,a^2+\mathrm{i}\,a\,b\,x+\sqrt{1-a^2}\;\sqrt{-1+a+b\,x}\;\sqrt{1+a+b\,x}\right)}{b^3\,\left(x+2\,a^2\,x\right)}\right]}{\left(1-a^2\right)^{5/2}}\right)$$

Problem 122: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 129 leaves, 6 steps):

$$24\,b^4\,x-\frac{24\,b^3\sqrt{-1+c+d\,x}\;\sqrt{1+c+d\,x}\;(a+b\,\text{ArcCosh}[c+d\,x])}{d}+\frac{12\,b^2\,(c+d\,x)\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{d}-\frac{4\,b\sqrt{-1+c+d\,x}\;\sqrt{1+c+d\,x}\;(a+b\,\text{ArcCosh}[c+d\,x])^3}{d}+\frac{(c+d\,x)\,(a+b\,\text{ArcCosh}[c+d\,x])^4}{d}$$

Result (type 3, 261 leaves):

$$\frac{1}{d}\Big(\left(a^4+12\,a^2\,b^2+24\,b^4\right)(c+d\,x)-4\,a\,b\,\left(a^2+6\,b^2\right)\sqrt{-1+c+d\,x}\;\sqrt{1+c+d\,x}-4\,b\,\Big(-a^3\,(c+d\,x)-6\,a\,b^2\,(c+d\,x)+3\,a^2\,b\sqrt{-1+c+d\,x}\;\sqrt{1+c+d\,x}+6\,b^3\sqrt{-1+c+d\,x}\;\sqrt{1+c+d\,x}\Big)\,\text{ArcCosh}[c+d\,x]+6\,b^2\,\Big(a^2\,(c+d\,x)+2\,b^2\,(c+d\,x)-2\,a\,b\sqrt{-1+c+d\,x}\;\sqrt{1+c+d\,x}\Big)\,\text{ArcCosh}[c+d\,x]^2-4\,b^3\,\Big(-a\,(c+d\,x)+b\sqrt{-1+c+d\,x}\;\sqrt{1+c+d\,x}\Big)\,\text{ArcCosh}[c+d\,x]^3+b^4\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]^4\Big)$$

Problem 124: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 264 leaves, 13 steps):

$$-\frac{(a+b\,\text{ArcCosh}[c+d\,x])^4}{d\,e^2\,(c+d\,x)}+\frac{8\,b\,(a+b\,\text{ArcCosh}[c+d\,x])^3\,\text{ArcTan}\left[e^{\text{ArcCosh}[c+d\,x]}\right]}{d\,e^2}-$$
$$\frac{12\,i\,b^2\,(a+b\,\text{ArcCosh}[c+d\,x])^2\,\text{PolyLog}\left[2,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]}{d\,e^2}+$$
$$\frac{12\,i\,b^2\,(a+b\,\text{ArcCosh}[c+d\,x])^2\,\text{PolyLog}\left[2,i\,e^{\text{ArcCosh}[c+d\,x]}\right]}{d\,e^2}+$$
$$\frac{24\,i\,b^3\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{PolyLog}\left[3,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]}{d\,e^2}-$$
$$\frac{24\,i\,b^3\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{PolyLog}\left[3,i\,e^{\text{ArcCosh}[c+d\,x]}\right]}{d\,e^2}-$$
$$\frac{24\,i\,b^4\,\text{PolyLog}\left[4,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]}{d\,e^2}+\frac{24\,i\,b^4\,\text{PolyLog}\left[4,i\,e^{\text{ArcCosh}[c+d\,x]}\right]}{d\,e^2}$$

Result (type 4, 872 leaves):

$$\frac{1}{d\,e^2}\left(-\frac{a^4}{c+d\,x}+4\,a^3\,b\left(-\frac{\text{ArcCosh}[c+d\,x]}{c+d\,x}+2\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c+d\,x]\right]\right]\right)-\right.$$
$$6\,i\,a^2\,b^2\left(\text{ArcCosh}[c+d\,x]\left(-\frac{i\,\text{ArcCosh}[c+d\,x]}{c+d\,x}+2\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-\right.\right.$$
$$\left.2\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)+2\,\text{PolyLog}\left[2,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-$$
$$\left.2\,\text{PolyLog}\left[2,i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)+4\,a\,b^3\left(-\frac{\text{ArcCosh}[c+d\,x]^3}{c+d\,x}+\right.$$
$$3\,i\left(-\text{ArcCosh}[c+d\,x]^2\left(\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)-\right.$$
$$2\,\text{ArcCosh}[c+d\,x]\left(\text{PolyLog}\left[2,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-\text{PolyLog}\left[2,i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)-$$
$$\left.\left.2\,\text{PolyLog}\left[3,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+2\,\text{PolyLog}\left[3,i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)\right)+$$
$$b^4\left(-\frac{7\,i\,\pi^4}{16}+\frac{1}{2}\,\pi^3\,\text{ArcCosh}[c+d\,x]-\frac{3}{2}\,i\,\pi^2\,\text{ArcCosh}[c+d\,x]^2-2\,\pi\,\text{ArcCosh}[c+d\,x]^3+\right.$$
$$i\,\text{ArcCosh}[c+d\,x]^4-\frac{\text{ArcCosh}[c+d\,x]^4}{c+d\,x}+\frac{1}{2}\,\pi^3\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-$$
$$3\,i\,\pi^2\,\text{ArcCosh}[c+d\,x]\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-$$
$$6\,\pi\,\text{ArcCosh}[c+d\,x]^2\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+4\,i\,\text{ArcCosh}[c+d\,x]^3\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+$$
$$3\,i\,\pi^2\,\text{ArcCosh}[c+d\,x]\,\text{Log}\left[1-i\,e^{\text{ArcCosh}[c+d\,x]}\right]+$$
$$6\,\pi\,\text{ArcCosh}[c+d\,x]^2\,\text{Log}\left[1-i\,e^{\text{ArcCosh}[c+d\,x]}\right]-\frac{1}{2}\,\pi^3\,\text{Log}\left[1+i\,e^{\text{ArcCosh}[c+d\,x]}\right]-$$
$$4\,i\,\text{ArcCosh}[c+d\,x]^3\,\text{Log}\left[1+i\,e^{\text{ArcCosh}[c+d\,x]}\right]+\frac{1}{2}\,\pi^3\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}\,(\pi+2\,i\,\text{ArcCosh}[c+d\,x])\right]\right]+$$
$$3\,i\,(\pi-2\,i\,\text{ArcCosh}[c+d\,x])^2\,\text{PolyLog}\left[2,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-$$
$$12\,i\,\text{ArcCosh}[c+d\,x]^2\,\text{PolyLog}\left[2,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]+3\,i\,\pi^2\,\text{PolyLog}\left[2,i\,e^{\text{ArcCosh}[c+d\,x]}\right]+$$
$$12\,\pi\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\left[2,i\,e^{\text{ArcCosh}[c+d\,x]}\right]+12\,\pi\,\text{PolyLog}\left[3,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-$$
$$24\,i\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\left[3,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+$$
$$24\,i\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\left[3,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]-12\,\pi\,\text{PolyLog}\left[3,i\,e^{\text{ArcCosh}[c+d\,x]}\right]-$$
$$\left.\left.24\,i\,\text{PolyLog}\left[4,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-24\,i\,\text{PolyLog}\left[4,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]\right)\right)$$

Problem 125: Result more than twice size of optimal antiderivative.

$$\int \frac{(a + b\,\mathrm{ArcCosh}[c + d\,x])^4}{(c\,e + d\,e\,x)^3}\,dx$$

Optimal (type 4, 195 leaves, 10 steps):

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

Result (type 4, 398 leaves):

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

$$12\,a^2\,b^2\left(\frac{\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]}{c+d\,x}-\frac{\text{ArcCosh}[c+d\,x]^2}{2\,(c+d\,x)^2}-\text{Log}[c+d\,x]\right)+$$

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

$$\left.\left.\frac{\text{ArcCosh}[c+d\,x]^2}{(c+d\,x)^2}+6\,\text{Log}\left[1+e^{-2\,\text{ArcCosh}[c+d\,x]}\right]\right)+3\,\text{PolyLog}\left[2,\,-e^{-2\,\text{ArcCosh}[c+d\,x]}\right]\right)+$$

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

$$\left.3\,\text{Log}\left[1+e^{-2\,\text{ArcCosh}[c+d\,x]}\right]\right)+$$

$$\left.\left.6\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\left[2,\,-e^{-2\,\text{ArcCosh}[c+d\,x]}\right]+3\,\text{PolyLog}\left[3,\,-e^{-2\,\text{ArcCosh}[c+d\,x]}\right]\right)\right)$$

Problem 126: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{ArcCosh}[c+d\,x])^4}{(c\,e+d\,e\,x)^4}\,dx$$

Optimal (type 4, 432 leaves, 21 steps):

$$\frac{2 b^2 \left(a+b \text{ArcCosh}[c+d x]\right)^2}{d e^4 (c+d x)}+\frac{2 b \sqrt{-1+c+d x} \sqrt{1+c+d x} \left(a+b \text{ArcCosh}[c+d x]\right)^3}{3 d e^4 (c+d x)^2}-$$
$$\frac{\left(a+b \text{ArcCosh}[c+d x]\right)^4}{3 d e^4 (c+d x)^3}-\frac{8 b^3 \left(a+b \text{ArcCosh}[c+d x]\right) \text{ArcTan}\left[e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}+$$
$$\frac{4 b \left(a+b \text{ArcCosh}[c+d x]\right)^3 \text{ArcTan}\left[e^{\text{ArcCosh}[c+d x]}\right]}{3 d e^4}+\frac{4 i b^4 \text{PolyLog}\left[2,-i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}-$$
$$\frac{2 i b^2 \left(a+b \text{ArcCosh}[c+d x]\right)^2 \text{PolyLog}\left[2,-i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}-$$
$$\frac{4 i b^4 \text{PolyLog}\left[2,i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}+\frac{2 i b^2 \left(a+b \text{ArcCosh}[c+d x]\right)^2 \text{PolyLog}\left[2,i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}+$$
$$\frac{4 i b^3 \left(a+b \text{ArcCosh}[c+d x]\right) \text{PolyLog}\left[3,-i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}-$$
$$\frac{4 i b^3 \left(a+b \text{ArcCosh}[c+d x]\right) \text{PolyLog}\left[3,i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}-$$
$$\frac{4 i b^4 \text{PolyLog}\left[4,-i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}+\frac{4 i b^4 \text{PolyLog}\left[4,i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}$$

Result (type 4, 1374 leaves):

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

$$\left(d\,e^4\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\sqrt{1+c+d\,x}\right)+\frac{1}{d\,e^4\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\sqrt{1+c+d\,x}}4\,a\,b^3\sqrt{-1+c+d\,x}$$

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

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

$$\frac{1}{d\,e^4\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\sqrt{1+c+d\,x}}b^4\sqrt{-1+c+d\,x}$$

$$\left(\frac{1}{2}\,i\left(8+\pi^2-4\,i\,\pi\,\text{ArcCosh}[c+d\,x]-4\,\text{ArcCosh}[c+d\,x]^2\right)\text{PolyLog}\left[2,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-\right.$$

$$\frac{1}{96}\,i\left(7\,\pi^4+8\,i\,\pi^3\,\text{ArcCosh}[c+d\,x]+24\,\pi^2\,\text{ArcCosh}[c+d\,x]^2+\frac{192\,i\,\text{ArcCosh}[c+d\,x]^2}{c+d\,x}-\right.$$

$$32\,i\,\pi\,\text{ArcCosh}[c+d\,x]^3+\frac{64\,i\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]^3}{(c+d\,x)^2}-16$$
$$\text{ArcCosh}[c+d\,x]^4-\frac{32\,i\,\text{ArcCosh}[c+d\,x]^4}{(c+d\,x)^3}-384\,\text{ArcCosh}[c+d\,x]\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+$$
$$8\,i\,\pi^3\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+384\,\text{ArcCosh}[c+d\,x]\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+$$
$$48\,\pi^2\,\text{ArcCosh}[c+d\,x]\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-$$
$$96\,i\,\pi\,\text{ArcCosh}[c+d\,x]^2\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-64\,\text{ArcCosh}[c+d\,x]^3$$
$$\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-48\,\pi^2\,\text{ArcCosh}[c+d\,x]\,\text{Log}\left[1-i\,e^{\text{ArcCosh}[c+d\,x]}\right]+$$
$$96\,i\,\pi\,\text{ArcCosh}[c+d\,x]^2\,\text{Log}\left[1-i\,e^{\text{ArcCosh}[c+d\,x]}\right]-8\,i\,\pi^3\,\text{Log}\left[1+i\,e^{\text{ArcCosh}[c+d\,x]}\right]+64$$

$$\text{ArcCosh}[c+d x]^3 \text{Log}\left[1+i e^{\text{ArcCosh}[c+d x]}\right]+8 i \pi^3 \text{Log}\left[\text{Tan}\left[\frac{1}{4}\left(\pi+2 i \text{ArcCosh}[c+d x]\right)\right]\right]+384 \text{PolyLog}\left[2, i e^{-\text{ArcCosh}[c+d x]}\right]+192 \text{ArcCosh}[c+d x]^2 \text{PolyLog}\left[2,-i e^{\text{ArcCosh}[c+d x]}\right]-48 \pi^2 \text{PolyLog}\left[2, i e^{\text{ArcCosh}[c+d x]}\right]+192 i \pi \text{ArcCosh}[c+d x] \text{PolyLog}\left[2, i e^{\text{ArcCosh}[c+d x]}\right]+192 i \pi \text{PolyLog}\left[3,-i e^{-\text{ArcCosh}[c+d x]}\right]+384 \text{ArcCosh}[c+d x] \text{PolyLog}\left[3,-i e^{-\text{ArcCosh}[c+d x]}\right]-384 \text{ArcCosh}[c+d x] \text{PolyLog}\left[3,-i e^{\text{ArcCosh}[c+d x]}\right]-192 i \pi \text{PolyLog}\left[3, i e^{\text{ArcCosh}[c+d x]}\right]+384 \text{PolyLog}\left[4,-i e^{-\text{ArcCosh}[c+d x]}\right]+384 \text{PolyLog}\left[4,-i e^{\text{ArcCosh}[c+d x]}\right]\Bigg)\Bigg)$$

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

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

Optimal (type 4, 408 leaves, 26 steps):

$$\frac{5 b^2 e^2 (c+d x) \sqrt{a+b \text{ArcCosh}[c+d x]}}{6 d}+\frac{5 b^2 e^2 (c+d x)^3 \sqrt{a+b \text{ArcCosh}[c+d x]}}{36 d}-\frac{5 b e^2 \sqrt{-1+c+d x} \sqrt{1+c+d x} (a+b \text{ArcCosh}[c+d x])^{3/2}}{9 d}-\frac{5 b e^2 \sqrt{-1+c+d x} (c+d x)^2 \sqrt{1+c+d x} (a+b \text{ArcCosh}[c+d x])^{3/2}}{18 d}+\frac{e^2 (c+d x)^3 (a+b \text{ArcCosh}[c+d x])^{5/2}}{3 d}-\frac{15 b^{5/2} e^2 e^{a/b} \sqrt{\pi} \text{Erf}\left[\frac{\sqrt{a+b \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right]}{64 d}-\frac{5 b^{5/2} e^2 e^{\frac{3 a}{b}} \sqrt{\frac{\pi}{3}} \text{Erf}\left[\frac{\sqrt{3} \sqrt{a+b \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right]}{576 d}-\frac{15 b^{5/2} e^2 e^{-\frac{a}{b}} \sqrt{\pi} \text{Erfi}\left[\frac{\sqrt{a+b \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right]}{64 d}-\frac{5 b^{5/2} e^2 e^{-\frac{3 a}{b}} \sqrt{\frac{\pi}{3}} \text{Erfi}\left[\frac{\sqrt{3} \sqrt{a+b \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right]}{576 d}$$

Result (type 4, 909 leaves):

$$\frac{1}{1728 d} e^2 \Bigg(432 a^2 c \sqrt{a+b \text{ArcCosh}[c+d x]}+1620 b^2 c \sqrt{a+b \text{ArcCosh}[c+d x]}+432 a^2 d x \sqrt{a+b \text{ArcCosh}[c+d x]}+1620 b^2 d x \sqrt{a+b \text{ArcCosh}[c+d x]}-1080 a b \sqrt{\frac{-1+c+d x}{1+c+d x}} \sqrt{a+b \text{ArcCosh}[c+d x]}-1080 a b c \sqrt{\frac{-1+c+d x}{1+c+d x}} \sqrt{a+b \text{ArcCosh}[c+d x]}-1080 a b d x \sqrt{\frac{-1+c+d x}{1+c+d x}}$$

$$\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+864\,a\,b\,c\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+$$
$$864\,a\,b\,d\,x\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-$$
$$1080\,b^2\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-$$
$$1080\,b^2\,c\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-$$
$$1080\,b^2\,d\,x\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+$$
$$432\,b^2\,c\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+$$
$$432\,b^2\,d\,x\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+$$
$$144\,a^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+$$
$$60\,b^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+$$
$$288\,a\,b\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+$$
$$144\,b^2\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]-$$
$$405\,b^{5/2}\,\sqrt{\pi}\,\text{Cosh}\left[\frac{a}{b}\right]\,\text{Erfi}\left[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]-$$
$$5\,b^{5/2}\,\sqrt{3\,\pi}\,\text{Cosh}\left[\frac{3\,a}{b}\right]\,\text{Erfi}\left[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]+$$
$$405\,b^{5/2}\,\sqrt{\pi}\,\text{Erfi}\left[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]\,\text{Sinh}\left[\frac{a}{b}\right]-$$
$$405\,b^{5/2}\,\sqrt{\pi}\,\text{Erf}\left[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]\,\left(\text{Cosh}\left[\frac{a}{b}\right]+\text{Sinh}\left[\frac{a}{b}\right]\right)+$$
$$5\,b^{5/2}\,\sqrt{3\,\pi}\,\text{Erfi}\left[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]\,\text{Sinh}\left[\frac{3\,a}{b}\right]-$$
$$5\,b^{5/2}\,\sqrt{3\,\pi}\,\text{Erf}\left[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]\,\left(\text{Cosh}\left[\frac{3\,a}{b}\right]+\text{Sinh}\left[\frac{3\,a}{b}\right]\right)-$$
$$120\,a\,b\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]-$$
$$\left.120\,b^2\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]\right)$$

Problem 167: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 509 leaves, 35 steps):

$$-\frac{175\, b^3\, e^2 \sqrt{-1+c+d\,x}\, \sqrt{1+c+d\,x}\, \sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{54\, d} - \frac{35\, b^3\, e^2 \sqrt{-1+c+d\,x}\, (c+d\,x)^2 \sqrt{1+c+d\,x}\, \sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{216\, d} + \frac{35\, b^2\, e^2\, (c+d\,x)\, (a+b\,\text{ArcCosh}[c+d\,x])^{3/2}}{18\, d} + \frac{35\, b^2\, e^2\, (c+d\,x)^3\, (a+b\,\text{ArcCosh}[c+d\,x])^{3/2}}{108\, d} - \frac{7\, b\, e^2 \sqrt{-1+c+d\,x}\, \sqrt{1+c+d\,x}\, (a+b\,\text{ArcCosh}[c+d\,x])^{5/2}}{9\, d} - \frac{7\, b\, e^2 \sqrt{-1+c+d\,x}\, (c+d\,x)^2 \sqrt{1+c+d\,x}\, (a+b\,\text{ArcCosh}[c+d\,x])^{5/2}}{18\, d} + \frac{e^2\, (c+d\,x)^3\, (a+b\,\text{ArcCosh}[c+d\,x])^{7/2}}{3\, d} - \frac{105\, b^{7/2}\, e^2\, e^{a/b} \sqrt{\pi}\, \text{Erf}\left[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]}{128\, d} - \frac{35\, b^{7/2}\, e^2\, e^{\frac{3a}{b}} \sqrt{\frac{\pi}{3}}\, \text{Erf}\left[\frac{\sqrt{3}\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]}{3456\, d} + \frac{105\, b^{7/2}\, e^2\, e^{-\frac{a}{b}} \sqrt{\pi}\, \text{Erfi}\left[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]}{128\, d} + \frac{35\, b^{7/2}\, e^2\, e^{-\frac{3a}{b}} \sqrt{\frac{\pi}{3}}\, \text{Erfi}\left[\frac{\sqrt{3}\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\right]}{3456\, d}$$

Result (type 4, 1435 leaves):

$$\frac{1}{10368\, d} e^2 \left(2592\, a^3\, c \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} + 22680\, a\, b^2\, c \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} + 2592\, a^3\, d\, x \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} + 22680\, a\, b^2\, d\, x \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} - 9072\, a^2\, b \sqrt{\frac{-1+c+d\,x}{1+c+d\,x}} \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} - 34020\, b^3 \sqrt{\frac{-1+c+d\,x}{1+c+d\,x}} \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} - 9072\, a^2\, b\, c \sqrt{\frac{-1+c+d\,x}{1+c+d\,x}} \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} - 34020\, b^3\, c \sqrt{\frac{-1+c+d\,x}{1+c+d\,x}} \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} - 9072\, a^2\, b\, d\, x \sqrt{\frac{-1+c+d\,x}{1+c+d\,x}} \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} - 34020\, b^3\, d\, x \sqrt{\frac{-1+c+d\,x}{1+c+d\,x}} \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} + 7776\, a^2\, b\, c\, \text{ArcCosh}[c+d\,x] \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} + 22680\, b^3\, c\, \text{ArcCosh}[c+d\,x] \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} + 7776\, a^2\, b\, d\, x\, \text{ArcCosh}[c+d\,x] \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} + 22680\, b^3\, d\, x\, \text{ArcCosh}[c+d\,x] \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} - 18144\, a\, b^2 \sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\, \text{ArcCosh}[c+d\,x] \sqrt{a+b\,\text{ArcCosh}[c+d\,x]} - \right.$$

$$18144\,a\,b^2\,c\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\;\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;-$$

$$18144\,a\,b^2\,d\,x\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\;\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;+$$

$$7776\,a\,b^2\,c\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;+$$

$$7776\,a\,b^2\,d\,x\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;-$$

$$9072\,b^3\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\;\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;-$$

$$9072\,b^3\,c\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\;\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;-$$

$$9072\,b^3\,d\,x\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\;\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;+$$

$$2592\,b^3\,c\,\text{ArcCosh}[c+d\,x]^3\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;+$$

$$2592\,b^3\,d\,x\,\text{ArcCosh}[c+d\,x]^3\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;+$$

$$864\,a^3\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]\;+$$

$$840\,a\,b^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]\;+$$

$$2592\,a^2\,b\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]\;+$$

$$840\,b^3\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]\;+$$

$$2592\,a\,b^2\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]\;+$$

$$864\,b^3\,\text{ArcCosh}[c+d\,x]^3\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]\;+$$

$$8505\,b^{7/2}\,\sqrt{\pi}\;\text{Cosh}\Big[\frac{a}{b}\Big]\;\text{Erfi}\Big[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\;+$$

$$35\,b^{7/2}\,\sqrt{3\,\pi}\;\text{Cosh}\Big[\frac{3\,a}{b}\Big]\;\text{Erfi}\Big[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\;-$$

$$8505\,b^{7/2}\,\sqrt{\pi}\;\text{Erfi}\Big[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\;\text{Sinh}\Big[\frac{a}{b}\Big]\;-$$

$$8505\,b^{7/2}\,\sqrt{\pi}\;\text{Erf}\Big[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\;\Big(\text{Cosh}\Big[\frac{a}{b}\Big]+\text{Sinh}\Big[\frac{a}{b}\Big]\Big)\;-$$

$$35\,b^{7/2}\,\sqrt{3\,\pi}\;\text{Erfi}\Big[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\;\text{Sinh}\Big[\frac{3\,a}{b}\Big]\;-$$

$$35\,b^{7/2}\,\sqrt{3\,\pi}\;\text{Erf}\Big[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\;\Big(\text{Cosh}\Big[\frac{3\,a}{b}\Big]+\text{Sinh}\Big[\frac{3\,a}{b}\Big]\Big)\;-$$

$$1008\,a^2\,b\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]\;-$$

$$420\,b^3\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]\;-$$

$$2016\,a\,b^2\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\;\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]\;-$$

$$1008\, b^3 \,\text{ArcCosh}[c+d x]^2 \sqrt{a+b\,\text{ArcCosh}[c+d x]}\; \text{Sinh}[3\,\text{ArcCosh}[c+d x]]\Bigg)$$

Problem 195: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 189 leaves, 8 steps):

$$-\frac{28\, b\, e^2 \sqrt{-1+c+d x}\, \left(e\,(c+d x)\right)^{3/2} \sqrt{1+c+d x}}{405\, d}-\frac{4\, b \sqrt{-1+c+d x}\, \left(e\,(c+d x)\right)^{7/2} \sqrt{1+c+d x}}{81\, d}+\frac{2 \left(e\,(c+d x)\right)^{9/2} \left(a+b\,\text{ArcCosh}[c+d x]\right)}{9\, d\, e}-\frac{28\, b\, e^3 \sqrt{1-c-d x}\, \sqrt{e\,(c+d x)}\; \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{1+c+d x}}{\sqrt{2}}\right], 2\right]}{135\, d \sqrt{-c-d x}\, \sqrt{-1+c+d x}}$$

Result (type 4, 219 leaves):

$$\frac{1}{135\, d}\left(e\,(c+d x)\right)^{7/2} \left(30\, a\,(c+d x)-\frac{28\, b}{\sqrt{-1+c+d x}\, (c+d x)^{5/2} \sqrt{\frac{c+d x}{1+c+d x}}}-\frac{4\, b \sqrt{-1+c+d x}\, \sqrt{1+c+d x}\, \left(7+5 c^2+10 c d x+5 d^2 x^2\right)}{3\,(c+d x)^2}+30\, b\,(c+d x)\, \text{ArcCosh}[c+d x]-\frac{28\, i\, b \sqrt{\frac{c+d x}{1+c+d x}} \sqrt{\frac{1+c+d x}{-1+c+d x}}\; \text{EllipticE}\left[i\, \text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d x}}\right], 2\right]}{(c+d x)^{7/2} \sqrt{\frac{c+d x}{-1+c+d x}}}\right)$$

Problem 196: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 169 leaves, 8 steps):

$$-\frac{20\,b\,e^2\,\sqrt{-1+c+d\,x}\,\sqrt{e\,(c+d\,x)}\,\sqrt{1+c+d\,x}}{147\,d}-\frac{4\,b\,\sqrt{-1+c+d\,x}\,(e\,(c+d\,x))^{5/2}\,\sqrt{1+c+d\,x}}{49\,d}+\frac{2\,(e\,(c+d\,x))^{7/2}\,(a+b\,\text{ArcCosh}[c+d\,x])}{7\,d\,e}-\frac{20\,b\,e^{5/2}\,\sqrt{1-c-d\,x}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{e\,(c+d\,x)}}{\sqrt{e}}\right],-1\right]}{147\,d\,\sqrt{-1+c+d\,x}}$$

Result (type 4, 164 leaves) :

$$\frac{1}{147\,d\,(c+d\,x)^2}\,2\,(e\,(c+d\,x))^{5/2}\left(21\,a\,(c+d\,x)^3-2\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\,\left(5+3\,c^2+6\,c\,d\,x+3\,d^2\,x^2\right)+21\,b\,(c+d\,x)^3\,\text{ArcCosh}[c+d\,x]-\frac{10\,i\,b\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}\,\sqrt{1+c+d\,x}}\right)$$

Problem 197: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 145 leaves, 6 steps) :

$$-\frac{4\,b\,\sqrt{-1+c+d\,x}\,(e\,(c+d\,x))^{3/2}\,\sqrt{1+c+d\,x}}{25\,d}+\frac{2\,(e\,(c+d\,x))^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])}{5\,d\,e}-\frac{12\,b\,e\,\sqrt{1-c-d\,x}\,\sqrt{e\,(c+d\,x)}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{1+c+d\,x}}{\sqrt{2}}\right],2\right]}{25\,d\,\sqrt{-c-d\,x}\,\sqrt{-1+c+d\,x}}$$

Result (type 4, 190 leaves) :

$$\frac{1}{25\,d}2\,\left(e\,\left(c+d\,x\right)\right)^{3/2}\left(5\,a\,\left(c+d\,x\right)-\frac{6\,b}{\sqrt{-1+c+d\,x}\,\sqrt{c+d\,x}\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}}-2\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}+5\,b\,\left(c+d\,x\right)\,\text{ArcCosh}[c+d\,x]-\frac{6\,i\,b\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\left(c+d\,x\right)^{3/2}\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right)$$

Problem 198: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{c\,e+d\,e\,x}\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)\,dx$$

Optimal (type 4, 127 leaves, 6 steps):

$$-\frac{4\,b\,\sqrt{-1+c+d\,x}\,\sqrt{e\,\left(c+d\,x\right)}\,\sqrt{1+c+d\,x}}{9\,d}+\frac{2\,\left(e\,\left(c+d\,x\right)\right)^{3/2}\left(a+b\,\text{ArcCosh}[c+d\,x]\right)}{3\,d\,e}-\frac{4\,b\,\sqrt{e}\,\sqrt{1-c-d\,x}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{e\,\left(c+d\,x\right)}}{\sqrt{e}}\right],-1\right]}{9\,d\,\sqrt{-1+c+d\,x}}$$

Result (type 4, 133 leaves):

$$\frac{1}{9\,d}2\,\sqrt{e\,\left(c+d\,x\right)}\left(3\,a\,\left(c+d\,x\right)-2\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}+3\,b\,\left(c+d\,x\right)\,\text{ArcCosh}[c+d\,x]-\frac{2\,i\,b\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}\,\sqrt{1+c+d\,x}}\right)$$

Problem 199: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 104 leaves, 4 steps):

$$\frac{2\sqrt{e\,(c+d\,x)}\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)}{d\,e}-\frac{4\,b\,\sqrt{1-c-d\,x}\,\sqrt{e\,(c+d\,x)}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{1+c+d\,x}}{\sqrt{2}}\right],2\right]}{d\,e\,\sqrt{-c-d\,x}\,\sqrt{-1+c+d\,x}}$$

Result (type 4, 163 leaves):

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

Problem 200: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 84 leaves, 4 steps):

$$-\frac{2\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)}{d\,e\,\sqrt{e\,(c+d\,x)}}+\frac{4\,b\,\sqrt{1-c-d\,x}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{e\,(c+d\,x)}}{\sqrt{e}}\right],-1\right]}{d\,e^{3/2}\,\sqrt{-1+c+d\,x}}$$

Result (type 4, 115 leaves):

$$\left(-2\,\sqrt{1+c+d\,x}\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)+\frac{4\,\mathrm{i}\,b\,(c+d\,x)\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right)\Big/\left(d\,e\,\sqrt{e\,(c+d\,x)}\,\sqrt{1+c+d\,x}\right)$$

Problem 201: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 150 leaves, 7 steps):

$$\frac{4 b \sqrt{-1+c+d x} \sqrt{1+c+d x}}{3 d e^2 \sqrt{e (c+d x)}}-\frac{2 (a+b \operatorname{ArcCosh}[c+d x])}{3 d e (e (c+d x))^{3/2}}-\frac{4 b \sqrt{1-c-d x} \sqrt{e (c+d x)} \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{1+c+d x}}{\sqrt{2}}\right],2\right]}{3 d e^3 \sqrt{-c-d x} \sqrt{-1+c+d x}}$$

Result (type 4, 197 leaves):

$$\left(2\left(-a (c+d x)-\frac{2 b (c+d x)^{7/2}}{\sqrt{-1+c+d x} \sqrt{\frac{c+d x}{1+c+d x}}}+2 b \sqrt{-1+c+d x} (c+d x)^2 \sqrt{1+c+d x}-b (c+d x) \operatorname{ArcCosh}[c+d x]-\frac{1}{\sqrt{\frac{c+d x}{-1+c+d x}}} 2 i b (c+d x)^{5/2} \sqrt{\frac{c+d x}{1+c+d x}} \sqrt{\frac{1+c+d x}{-1+c+d x}} \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d x}}\right],2\right]\right)\right) \Big/ \left(3 d (e (c+d x))^{5/2}\right)$$

Problem 202: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 130 leaves, 7 steps):

$$\frac{4 b \sqrt{-1+c+d x} \sqrt{1+c+d x}}{15 d e^2 (e (c+d x))^{3/2}}-\frac{2 (a+b \operatorname{ArcCosh}[c+d x])}{5 d e (e (c+d x))^{5/2}}+\frac{4 b \sqrt{1-c-d x} \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{e (c+d x)}}{\sqrt{e}}\right],-1\right]}{15 d e^{7/2} \sqrt{-1+c+d x}}$$

Result (type 4, 121 leaves):

$$\left(2\left(-3 a+2 b c \sqrt{-1+c+d x} \sqrt{1+c+d x}+2 b d x \sqrt{-1+c+d x} \sqrt{1+c+d x}-3 b \operatorname{ArcCosh}[c+d x]-i \sqrt{2} b (c+d x)^{5/2} \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-1+c+d x}\right],\frac{1}{2}\right]\right)\right) \Big/ \left(15 d e (e (c+d x))^{5/2}\right)$$

Problem 203: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 5, 165 leaves, 3 steps):

$$\frac{2\,(e\,(c+d\,x))^{9/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{9\,d\,e} - \left(8\,b\,(e\,(c+d\,x))^{11/2}\,\sqrt{1-(c+d\,x)^2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{11}{4},\frac{15}{4},(c+d\,x)^2\right]\right)\Big/\left(99\,d\,e^2\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\right) - \frac{1}{1287\,d\,e^3}16\,b^2\,(e\,(c+d\,x))^{13/2}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{13}{4},\frac{13}{4}\right\},\left\{\frac{15}{4},\frac{17}{4}\right\},(c+d\,x)^2\right]$$

Result (type 5, 303 leaves):

$$\frac{1}{9\,d}(e\,(c+d\,x))^{7/2}\left(2\,a^2\,(c+d\,x)+4\,a\,b\,(c+d\,x)\,\text{ArcCosh}[c+d\,x] - \frac{1}{45\,(c+d\,x)^{7/2}}8\,a\,b\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\left(\frac{21+14\,(c+d\,x)+2\,(c+d\,x)^3+5\,(c+d\,x)^5}{\sqrt{-1+c+d\,x}} + \frac{21\,i\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right) + \frac{2}{11}\,b^2\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]\left(11\,\text{ArcCosh}[c+d\,x] + 4\,(c+d\,x)\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{Hypergeometric2F1}\left[1,\frac{13}{4},\frac{15}{4},(c+d\,x)^2\right]\right) - \left(945\,b^2\,\pi\,(c+d\,x)^3\,\text{HypergeometricPFQ}\left[\left\{1,\frac{13}{4},\frac{13}{4}\right\},\left\{\frac{15}{4},\frac{17}{4}\right\},(c+d\,x)^2\right]\right)\Big/\left(512\,\sqrt{2}\,\text{Gamma}\left[\frac{15}{4}\right]\,\text{Gamma}\left[\frac{17}{4}\right]\right)\right)$$

Problem 204: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 5, 165 leaves, 3 steps):

$$\frac{2\,(e\,(c+d\,x))^{7/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{7\,d\,e}-\left(8\,b\,(e\,(c+d\,x))^{9/2}\,\sqrt{1-(c+d\,x)^2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{9}{4},\frac{13}{4},(c+d\,x)^2\right]\right)\Big/\left(63\,d\,e^2\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\right)-\frac{1}{693\,d\,e^3}16\,b^2\,(e\,(c+d\,x))^{11/2}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{11}{4},\frac{11}{4}\right\},\left\{\frac{13}{4},\frac{15}{4}\right\},(c+d\,x)^2\right]$$

Result (type 5, 369 leaves):

$$\frac{1}{6174\,d\,(c+d\,x)^2}\,(e\,(c+d\,x))^{5/2}\left(1764\,a^2\,(c+d\,x)^3+3528\,a\,b\,(c+d\,x)^3\,\text{ArcCosh}[c+d\,x]-\frac{1}{\sqrt{1+c+d\,x}}\right.$$

$$336\,a\,b\left(\sqrt{-1+c+d\,x}\,\left(5+5\,(c+d\,x)+3\,(c+d\,x)^2+3\,(c+d\,x)^3\right)+\right.$$

$$\left.\frac{5\,\mathrm{i}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right)+b^2\left(1336\,(c+d\,x)-\right.$$

$$1932\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]+1323\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]^2+$$

$$72\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+441\,\text{ArcCosh}[c+d\,x]^2\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+$$

$$1680\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{5}{4},(c+d\,x)^2\right]-$$

$$\left(210\,\sqrt{2}\,\pi\,(c+d\,x)\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]\right)\Big/$$

$$\left.\left.\left(\text{Gamma}\left[\frac{5}{4}\right]\,\text{Gamma}\left[\frac{7}{4}\right]\right)-252\,\text{ArcCosh}[c+d\,x]\,\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]\right)\right)$$

Problem 205: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 5, 165 leaves, 3 steps):

$$\frac{2\,(e\,(c+d\,x))^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{5\,d\,e}-$$
$$\left(8\,b\,(e\,(c+d\,x))^{7/2}\,\sqrt{1-(c+d\,x)^2}\,(a+b\,\text{ArcCosh}[c+d\,x])\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{7}{4},\frac{11}{4},(c+d\,x)^2\right]\right)\Big/\left(35\,d\,e^2\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\right)-$$
$$\frac{1}{315\,d\,e^3}16\,b^2\,(e\,(c+d\,x))^{9/2}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{9}{4},\frac{9}{4}\right\},\left\{\frac{11}{4},\frac{13}{4}\right\},(c+d\,x)^2\right]$$

Result (type 5, 326 leaves) :

$$\frac{1}{5\,d}\,(e\,(c+d\,x))^{3/2}$$
$$\left(2\,a^2\,(c+d\,x)+4\,a\,b\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]+\frac{8}{5}\,a\,b\left(-\frac{3}{\sqrt{-1+c+d\,x}\,\sqrt{c+d\,x}\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}}-\right.\right.$$
$$\left.\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}-\frac{3\,i\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{(c+d\,x)^{3/2}\,\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right)+$$
$$\frac{2}{7}\,b^2\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]\left(7\,\text{ArcCosh}[c+d\,x]+4\,(c+d\,x)\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\right.$$
$$\left.(1+c+d\,x)\,\text{Hypergeometric2F1}\left[1,\frac{9}{4},\frac{11}{4},(c+d\,x)^2\right]\right)-$$
$$\left(15\,b^2\,\pi\,(c+d\,x)^3\,\text{HypergeometricPFQ}\left[\left\{1,\frac{9}{4},\frac{9}{4}\right\},\left\{\frac{11}{4},\frac{13}{4}\right\},(c+d\,x)^2\right]\right)\Big/$$
$$\left.\left(32\,\sqrt{2}\,\text{Gamma}\left[\frac{11}{4}\right]\,\text{Gamma}\left[\frac{13}{4}\right]\right)\right)$$

Problem 206: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 5, 165 leaves, 3 steps) :

$$\frac{2\,(e\,(c+d\,x))^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{3\,d\,e}-$$
$$\left(8\,b\,(e\,(c+d\,x))^{5/2}\,\sqrt{1-(c+d\,x)^2}\,(a+b\,\text{ArcCosh}[c+d\,x])\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5}{4},\frac{9}{4},(c+d\,x)^2\right]\right)\Big/\left(15\,d\,e^2\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\right)-$$
$$\frac{1}{105\,d\,e^3}16\,b^2\,(e\,(c+d\,x))^{7/2}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{7}{4},\frac{7}{4}\right\},\left\{\frac{9}{4},\frac{11}{4}\right\},(c+d\,x)^2\right]$$

Result (type 5, 298 leaves):

$$\frac{1}{27\,d}$$
$$\sqrt{e\,(c+d\,x)}\,\left(18\,a^2\,(c+d\,x)-24\,a\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}+36\,a\,b\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]-\right.$$
$$24\,b^2\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]+2\,b^2\,(c+d\,x)\,\left(8+9\,\text{ArcCosh}[c+d\,x]^2\right)-$$
$$\frac{24\,i\,a\,b\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}\,\sqrt{1+c+d\,x}}+$$
$$24\,b^2\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{5}{4},(c+d\,x)^2\right]-$$
$$\left(3\,\sqrt{2}\,b^2\,\pi\,(c+d\,x)\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]\right)\Big/$$
$$\left.\left(\text{Gamma}\left[\frac{5}{4}\right]\,\text{Gamma}\left[\frac{7}{4}\right]\right)\right)$$

Problem 207: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 5, 163 leaves, 3 steps):

$$\frac{2\sqrt{e\,(c+d\,x)}\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)^2}{d\,e}-\left(8\,b\,\left(e\,(c+d\,x)\right)^{3/2}\sqrt{1-(c+d\,x)^2}\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},(c+d\,x)^2\right]\right)\Big/\left(3\,d\,e^2\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\right)-\frac{1}{15\,d\,e^3}16\,b^2\,\left(e\,(c+d\,x)\right)^{5/2}\text{HypergeometricPFQ}\left[\left\{1,\frac{5}{4},\frac{5}{4}\right\},\left\{\frac{7}{4},\frac{9}{4}\right\},(c+d\,x)^2\right]$$

Result (type 5, 268 leaves) :

$$\frac{1}{12\,d\sqrt{e\,(c+d\,x)}}\left(24\,a^2\,(c+d\,x)+48\,a\,b\left((c+d\,x)\,\text{ArcCosh}[c+d\,x]-\left(2\sqrt{\frac{c+d\,x}{1+c+d\,x}}\left(c+d\,x+(c+d\,x)^2+i\,(-1+c+d\,x)^{3/2}\sqrt{\frac{c+d\,x}{-1+c+d\,x}}\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]\right)\right)\Big/\left(\sqrt{-1+c+d\,x}\,\sqrt{c+d\,x}\right)\right)+b^2\,(c+d\,x)\left(-\left(\left(3\sqrt{2}\,\pi\,(c+d\,x)^2\,\text{HypergeometricPFQ}\left[\left\{1,\frac{5}{4},\frac{5}{4}\right\},\left\{\frac{7}{4},\frac{9}{4}\right\},(c+d\,x)^2\right]\right)\Big/\left(\text{Gamma}\left[\frac{7}{4}\right]\text{Gamma}\left[\frac{9}{4}\right]\right)\right)+8\,\text{ArcCosh}[c+d\,x]\left(3\,\text{ArcCosh}[c+d\,x]+2\,\text{Hypergeometric2F1}\left[1,\frac{5}{4},\frac{7}{4},(c+d\,x)^2\right]\text{Sinh}[2\,\text{ArcCosh}[c+d\,x]]\right)\right)\right)$$

Problem 208: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 5, 161 leaves, 3 steps) :

$$-\frac{2\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)^2}{d\,e\sqrt{e\,(c+d\,x)}}+\left(8\,b\sqrt{e\,(c+d\,x)}\,\sqrt{1-(c+d\,x)^2}\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},(c+d\,x)^2\right]\right)\Big/\left(d\,e^2\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\right)+\frac{1}{3\,d\,e^3}16\,b^2\,\left(e\,(c+d\,x)\right)^{3/2}\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]$$

Result (type 5, 208 leaves) :

$$\frac{1}{d\,e\,\sqrt{e\,(c+d\,x)}}\left(\frac{1}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}8\,i\,a\,b\,\sqrt{c+d\,x}\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]+\right.$$

$$\left(\sqrt{2}\,b^2\,\pi\,(c+d\,x)^2\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]\right)\Big/$$

$$\left(\text{Gamma}\left[\frac{5}{4}\right]\text{Gamma}\left[\frac{7}{4}\right]\right)-2\left((a+b\,\text{ArcCosh}[c+d\,x])^2+\right.$$

$$\left.\left.2\,b^2\,\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{5}{4},(c+d\,x)^2\right]\text{Sinh}[2\,\text{ArcCosh}[c+d\,x]]\right)\right)$$

Problem 209: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 5, 165 leaves, 3 steps):

$$-\frac{2\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{3\,d\,e\,(e\,(c+d\,x))^{3/2}}-$$

$$\left(8\,b\,\sqrt{1-(c+d\,x)^2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},(c+d\,x)^2\right]\right)\Big/$$

$$\left(3\,d\,e^2\,\sqrt{-1+c+d\,x}\,\sqrt{e\,(c+d\,x)}\,\sqrt{1+c+d\,x}\right)-\frac{1}{3\,d\,e^3}$$

$$16\,b^2\,\sqrt{e\,(c+d\,x)}\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{4},1\right\},\left\{\frac{3}{4},\frac{5}{4}\right\},(c+d\,x)^2\right]$$

Result (type 5, 347 leaves):

$$\frac{1}{3\,d\,\left(e\,\left(c+d\,x\right)\right)^{5/2}}\left(-2\,a^2\,\left(c+d\,x\right)-16\,b^2\,\left(c+d\,x\right)^3-4\,a\,b\,\left(c+d\,x\right)\,\text{ArcCosh}[c+d\,x]+8\,b^2\,\left(c+d\,x\right)^2\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\right.$$

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

$$8\,a\,b\,\left(c+d\,x\right)^{3/2}\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\,\left(1+c+d\,x+\mathrm{i}\,\left(-1+c+d\,x\right)^{3/2}\,\sqrt{\frac{c+d\,x}{-1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\right.$$

$$\left.\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],\,2\right]\right)+\frac{8}{3}\,b^2\,\left(c+d\,x\right)^4\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}$$

$$\left(1+c+d\,x\right)\,\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\left[1,\,\frac{5}{4},\,\frac{7}{4},\,\left(c+d\,x\right)^2\right]-$$

$$\left.\frac{b^2\,\pi\,\left(c+d\,x\right)^5\,\text{HypergeometricPFQ}\left[\left\{1,\,\frac{5}{4},\,\frac{5}{4}\right\},\,\left\{\frac{7}{4},\,\frac{9}{4}\right\},\,\left(c+d\,x\right)^2\right]}{2\,\sqrt{2}\,\text{Gamma}\left[\frac{7}{4}\right]\,\text{Gamma}\left[\frac{9}{4}\right]}\right)$$

Problem 210: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 5, 165 leaves, 3 steps):

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

$$\left(8\,b\,\sqrt{1-\left(c+d\,x\right)^2}\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)\,\text{Hypergeometric2F1}\left[-\frac{3}{4},\,\frac{1}{2},\,\frac{1}{4},\,\left(c+d\,x\right)^2\right]\right)\Big/$$

$$\left(15\,d\,e^2\,\sqrt{-1+c+d\,x}\,\left(e\,\left(c+d\,x\right)\right)^{3/2}\,\sqrt{1+c+d\,x}\right)+$$

$$\frac{16\,b^2\,\text{HypergeometricPFQ}\left[\left\{-\frac{1}{4},\,-\frac{1}{4},\,1\right\},\,\left\{\frac{1}{4},\,\frac{3}{4}\right\},\,\left(c+d\,x\right)^2\right]}{15\,d\,e^3\,\sqrt{e\,\left(c+d\,x\right)}}$$

Result (type 5, 272 leaves):

$$\frac{1}{15\,d\,e\,(e\,(c+d\,x))^{5/2}}\Bigg(-6\,a^2+4\,a\,b\,\Big(-3\,\text{ArcCosh}[c+d\,x]+(c+d\,x)\Big(2\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}-\mathrm{i}\,\sqrt{2}\,(c+d\,x)^{3/2}\,\text{EllipticF}\Big[\mathrm{i}\,\text{ArcSinh}\big[\sqrt{-1+c+d\,x}\big],\frac{1}{2}\Big]\Big)\Big)+b^2\Bigg(16\,(c+d\,x)^2+8\,(c+d\,x)\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]-6\,\text{ArcCosh}[c+d\,x]^2-8\,(c+d\,x)^3\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\Big[\frac{3}{4},1,\frac{5}{4},(c+d\,x)^2\Big]+\Big(\sqrt{2}\,\pi\,(c+d\,x)^4\,\text{HypergeometricPFQ}\Big[\Big\{\frac{3}{4},\frac{3}{4},1\Big\},\Big\{\frac{5}{4},\frac{7}{4}\Big\},(c+d\,x)^2\Big]\Big)\Big/\Big(\text{Gamma}\Big[\frac{5}{4}\Big]\,\text{Gamma}\Big[\frac{7}{4}\Big]\Big)\Bigg)\Bigg)$$

Problem 211: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 89 leaves, 2 steps):

$$\frac{2\,(e\,(c+d\,x))^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^3}{5\,d\,e}-\frac{6\,b\,\text{Int}\Big[\frac{(e\,(c+d\,x))^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}},x\Big]}{5\,e}$$

Result (type 1, 1 leaves):

???

Problem 212: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 87 leaves, 2 steps):

$$\frac{2\,(e\,(c+d\,x))^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^3}{3\,d\,e}-\frac{2\,b\,\text{Int}\Big[\frac{(e\,(c+d\,x))^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}},x\Big]}{e}$$

Result (type 1, 1 leaves):

???

Problem 216: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 89 leaves, 2 steps):

$$-\frac{2\,(a + b\,\text{ArcCosh}[c + d\,x])^3}{5\,d\,e\,(e\,(c + d\,x))^{5/2}} + \frac{6\,b\,\text{Int}\left[\frac{(a+b\,\text{ArcCosh}[c+d\,x])^2}{\sqrt{-1+c+d\,x}\,\,(e\,(c+d\,x))^{5/2}\,\sqrt{1+c+d\,x}},\,x\right]}{5\,e}$$

Result (type 1, 1 leaves):

???

Problem 218: Attempted integration timed out after 120 seconds.

$$\int \sqrt{c\,e + d\,e\,x}\,\,(a + b\,\text{ArcCosh}[c + d\,x])^4\, dx$$

Optimal (type 8, 89 leaves, 2 steps):

$$\frac{2\,(e\,(c + d\,x))^{3/2}\,(a + b\,\text{ArcCosh}[c + d\,x])^4}{3\,d\,e} - \frac{8\,b\,\text{Int}\left[\frac{(e\,(c+d\,x))^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^3}{\sqrt{-1+c+d\,x}\,\,\sqrt{1+c+d\,x}},\,x\right]}{3\,e}$$

Result (type 1, 1 leaves):

???

Problem 222: Attempted integration timed out after 120 seconds.

$$\int \frac{(a + b \,\text{ArcCosh}[c + d\,x])^4}{(c\,e + d\,e\,x)^{7/2}}\, dx$$

Optimal (type 8, 89 leaves, 2 steps):

$$-\frac{2\,(a + b\,\text{ArcCosh}[c + d\,x])^4}{5\,d\,e\,(e\,(c + d\,x))^{5/2}} + \frac{8\,b\,\text{Int}\left[\frac{(a+b\,\text{ArcCosh}[c+d\,x])^3}{\sqrt{-1+c+d\,x}\,\,(e\,(c+d\,x))^{5/2}\,\sqrt{1+c+d\,x}},\,x\right]}{5\,e}$$

Result (type 1, 1 leaves):

???

Problem 225: Unable to integrate problem.

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

Optimal (type 5, 218 leaves, 3 steps):

$$\frac{(e\,(c+d\,x))^{1+m}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{d\,e\,(1+m)}-$$
$$\left(2\,b\,(e\,(c+d\,x))^{2+m}\,\sqrt{1-(c+d\,x)^2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},(c+d\,x)^2\right]\right)\Big/$$
$$\left(d\,e^2\,(1+m)\,(2+m)\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\right)-$$
$$\left(2\,b^2\,(e\,(c+d\,x))^{3+m}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{3}{2}+\frac{m}{2},\frac{3}{2}+\frac{m}{2}\right\},\left\{2+\frac{m}{2},\frac{5}{2}+\frac{m}{2}\right\},(c+d\,x)^2\right]\right)\Big/$$
$$\left(d\,e^3\,(1+m)\,(2+m)\,(3+m)\right)$$

Result (type 8, 25 leaves):

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

Problem 226: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 5, 118 leaves, 5 steps):

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

Result (type 6, 398 leaves):

$$\frac{1}{d\,(1+m)}\,(e\,(c+d\,x))^m \Bigg(-\Bigg(\Big(12\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c-d\,x,\frac{1}{2}\,(1-c-d\,x)\Big]\Big)\Big/ \Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c-d\,x,\frac{1}{2}\,(1-c-d\,x)\Big]+(-1+c+d\,x)\,\Big(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c-d\,x,\frac{1}{2}\,(1-c-d\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c-d\,x,\frac{1}{2}\,(1-c-d\,x)\Big]\Big)\Big)\Bigg)+\Big(12\,b\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c-d\,x,\frac{1}{2}\,(1-c-d\,x)\Big]\Big)\Big/ \Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c-d\,x,\frac{1}{2}\,(1-c-d\,x)\Big]+(-1+c+d\,x)\,\Big(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c-d\,x,\frac{1}{2}\,(1-c-d\,x)\Big]-\text{AppellF1}\Big[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c-d\,x,\frac{1}{2}\,(1-c-d\,x)\Big]\Big)\Big)+(c+d\,x)\,(a+b\,\text{ArcCosh}[c+d\,x])\Bigg)$$

Problem 236: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcCosh}[a\,x^n]}{x}\,dx$$

Optimal (type 4, 60 leaves, 5 steps):

$$-\frac{\text{ArcCosh}[a\,x^n]^2}{2\,n}+\frac{\text{ArcCosh}[a\,x^n]\,\text{Log}\big[1+e^{2\,\text{ArcCosh}[a\,x^n]}\big]}{n}+\frac{\text{PolyLog}\big[2,-e^{2\,\text{ArcCosh}[a\,x^n]}\big]}{2\,n}$$

Result (type 4, 179 leaves):

$$\text{ArcCosh}[a\,x^n]\,\text{Log}[x]+\Big(a\,\sqrt{1-a^2\,x^{2\,n}}\,\Big(\text{ArcSinh}\big[\sqrt{-a^2}\,x^n\big]^2+2\,\text{ArcSinh}\big[\sqrt{-a^2}\,x^n\big]\,\text{Log}\big[1-e^{-2\,\text{ArcSinh}[\sqrt{-a^2}\,x^n]}\big]-2\,n\,\text{Log}[x]\,\text{Log}\big[\sqrt{-a^2}\,x^n+\sqrt{1-a^2\,x^{2\,n}}\big]-\text{PolyLog}\big[2,e^{-2\,\text{ArcSinh}[\sqrt{-a^2}\,x^n]}\big]\Big)\Big)\Big/\Big(2\,\sqrt{-a^2}\,n\,\sqrt{-1+a\,x^n}\,\sqrt{1+a\,x^n}\Big)$$

Problem 266: Unable to integrate problem.

$$\int \frac{\Big(a+b\,\text{ArcCosh}\Big[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\Big]\Big)^3}{1-c^2\,x^2}\,dx$$

Optimal (type 4, 265 leaves, 8 steps):

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

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

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

Result (type 8, 42 leaves):

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

Problem 267: Unable to integrate problem.

$$\int\frac{\left(a+b\,\text{ArcCosh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2}{1-c^2\,x^2}\,dx$$

Optimal (type 4, 197 leaves, 7 steps):

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

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

Result (type 8, 42 leaves):

$$\int\frac{\left(a+b\,\text{ArcCosh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2}{1-c^2\,x^2}\,dx$$

Problem 268: Unable to integrate problem.

$$\int\frac{a+b\,\text{ArcCosh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]}{1-c^2\,x^2}\,dx$$

Optimal (type 4, 133 leaves, 6 steps):

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

Result (type 8, 40 leaves):

$$\int \frac{a+b\,\text{ArcCosh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]}{1-c^2\,x^2}\,dx$$

Problem 271: Attempted integration timed out after 120 seconds.

$$\int \text{ArcCosh}\left[c\,e^{a+b\,x}\right]\,dx$$

Optimal (type 4, 76 leaves, 6 steps):

$$-\frac{\text{ArcCosh}\left[c\,e^{a+b\,x}\right]^2}{2\,b}+\frac{\text{ArcCosh}\left[c\,e^{a+b\,x}\right]\,\text{Log}\left[1+e^{2\,\text{ArcCosh}\left[c\,e^{a+b\,x}\right]}\right]}{b}+\frac{\text{PolyLog}\left[2,\,-e^{2\,\text{ArcCosh}\left[c\,e^{a+b\,x}\right]}\right]}{2\,b}$$

Result (type 1, 1 leaves):

???

Problem 275: Result more than twice size of optimal antiderivative.

$$\int e^{\text{ArcCosh}[a+b\,x]}\,dx$$

Optimal (type 3, 31 leaves, 5 steps):

$$\frac{e^{2\,\text{ArcCosh}[a+b\,x]}}{4\,b}-\frac{\text{ArcCosh}[a+b\,x]}{2\,b}$$

Result (type 3, 69 leaves):

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

Problem 276: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcCosh}[a+b\,x]}}{x}\,dx$$

Optimal (type 3, 100 leaves, 9 steps):

$$b x+\sqrt{-1+a+b x}\ \sqrt{1+a+b x}+2 a \operatorname{ArcSinh}\left[\frac{\sqrt{-1+a+b x}}{\sqrt{2}}\right]+$$
$$2 \sqrt{1-a^2}\ \operatorname{ArcTan}\left[\frac{\sqrt{1-a}\ \sqrt{1+a+b x}}{\sqrt{1+a}\ \sqrt{-1+a+b x}}\right]+a \operatorname{Log}[x]$$

Result (type 3, 141 leaves):

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

Problem 277: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\operatorname{ArcCosh}[a+b x]}}{x^2} \, dx$$

Optimal (type 3, 109 leaves, 9 steps):

$$-\frac{a}{x}-\frac{\sqrt{-1+a+b x}\ \sqrt{1+a+b x}}{x}+$$
$$2 b \operatorname{ArcSinh}\left[\frac{\sqrt{-1+a+b x}}{\sqrt{2}}\right]-\frac{2 a b \operatorname{ArcTan}\left[\frac{\sqrt{1-a}\ \sqrt{1+a+b x}}{\sqrt{1+a}\ \sqrt{-1+a+b x}}\right]}{\sqrt{1-a^2}}+b \operatorname{Log}[x]$$

Result (type 3, 140 leaves):

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

Problem 278: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\operatorname{ArcCosh}[a+b x]}}{x^3} \, dx$$

Optimal (type 3, 138 leaves, 7 steps):

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

Result (type 3, 142 leaves):

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

Problem 279: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{\text{ArcCosh}[a+b\,x]}}{x^4}\,dx$$

Optimal (type 3, 189 leaves, 8 steps):

$$-\frac{a}{3\,x^3}-\frac{b}{2\,x^2}+\frac{a\,b^2\,\sqrt{-1+a+b\,x}\,\sqrt{1+a+b\,x}}{2\,\left(1-a^2\right)^2\,x}-\frac{a\,b\,\sqrt{-1+a+b\,x}\,\left(1+a+b\,x\right)^{3/2}}{2\,\left(1-a\right)\,\left(1+a\right)^2\,x^2}+\frac{\left(-1+a+b\,x\right)^{3/2}\,\left(1+a+b\,x\right)^{3/2}}{3\,\left(1-a^2\right)\,x^3}-\frac{a\,b^3\,\text{ArcTan}\left[\frac{\sqrt{1-a}\,\sqrt{1+a+b\,x}}{\sqrt{1+a}\,\sqrt{-1+a+b\,x}}\right]}{\left(1-a^2\right)^{5/2}}$$

Result (type 3, 179 leaves):

$$\frac{1}{6}\left(-\frac{2\,a}{x^3}-\frac{3\,b}{x^2}+\frac{1}{\left(-1+a^2\right)^2\,x^3}\sqrt{-1+a+b\,x}\,\sqrt{1+a+b\,x}\,\left(-2-2\,a^4+a\,b\,x-a^3\,b\,x+2\,b^2\,x^2+a^2\,\left(4+b^2\,x^2\right)\right)-\frac{3\,i\,a\,b^3\,\text{Log}\left[\frac{4\,\left(1-a^2\right)^{3/2}\,\left(-i+i\,a^2+i\,a\,b\,x+\sqrt{1-a^2}\,\sqrt{-1+a+b\,x}\,\sqrt{1+a+b\,x}\right)}{a\,b^3\,x}\right]}{\left(1-a^2\right)^{5/2}}\right)$$

Problem 280: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{\text{ArcCosh}[a+b\,x]}}{x^5}\,dx$$

Optimal (type 3, 238 leaves, 10 steps):

$$-\frac{a}{4x^4}-\frac{b}{3x^3}-\frac{\sqrt{-1+a+bx}\,\sqrt{1+a+bx}}{4x^4}+\frac{a\,b\,\sqrt{-1+a+bx}\,\sqrt{1+a+bx}}{12\left(1-a^2\right)x^3}+\frac{\left(3+2a^2\right)b^2\sqrt{-1+a+bx}\,\sqrt{1+a+bx}}{24\left(1-a^2\right)^2x^2}+\frac{a\left(13+2a^2\right)b^3\sqrt{-1+a+bx}\,\sqrt{1+a+bx}}{24\left(1-a^2\right)^3x}-\frac{\left(1+4a^2\right)b^4\,\text{ArcTan}\left[\frac{\sqrt{1-a}\,\sqrt{1+a+bx}}{\sqrt{1+a}\,\sqrt{-1+a+bx}}\right]}{4\left(1-a^2\right)^{7/2}}$$

Result (type 3, 198 leaves):

$$\frac{1}{24}\left(-\frac{6a}{x^4}-\frac{8b}{x^3}-\frac{1}{x^4}\sqrt{-1+a+bx}\,\sqrt{1+a+bx}\left(6+\frac{2abx}{-1+a^2}-\frac{\left(3+2a^2\right)b^2x^2}{\left(-1+a^2\right)^2}+\frac{a\left(13+2a^2\right)b^3x^3}{\left(-1+a^2\right)^3}\right)-\frac{1}{\left(1-a^2\right)^{7/2}}3\,\mathrm{i}\left(1+4a^2\right)b^4\,\text{Log}\left[\frac{1}{b^4\left(x+4a^2x\right)}16\,\mathrm{i}\left(1-a^2\right)^{5/2}\left(-1+a^2+abx-\mathrm{i}\sqrt{1-a^2}\,\sqrt{-1+a+bx}\,\sqrt{1+a+bx}\right)\right]\right)$$

Problem 291: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \text{ArcCosh}\left[\frac{c}{a+bx}\right]dx$$

Optimal (type 3, 58 leaves, 5 steps):

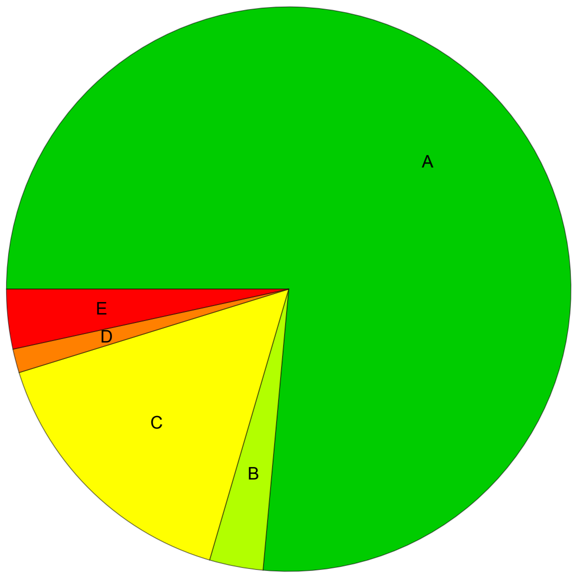
$$\frac{(a+bx)\,\text{ArcSech}\left[\frac{a}{c}+\frac{bx}{c}\right]}{b}-\frac{2c\,\text{ArcTan}\left[\sqrt{\frac{\left(1-\frac{a}{c}\right)c-bx}{a+c+bx}}\right]}{b}$$

Result (type 3, 143 leaves):

$$x\,\text{ArcCosh}\left[\frac{c}{a+bx}\right]+\left(\sqrt{a-c+bx}\left(\mathrm{i}\,a\,\text{Log}\left[-\frac{2b^2\left(-\mathrm{i}\,c+\sqrt{a-c+bx}\,\sqrt{a+c+bx}\right)}{a\,(a+bx)}\right]+c\,\text{Log}\left[a+bx+\sqrt{a-c+bx}\,\sqrt{a+c+bx}\right]\right)\right)\Big/\left(b\sqrt{-\frac{a-c+bx}{a+c+bx}}\,\sqrt{a+c+bx}\right)$$

Summary of Integration Test Results

293 integration problems



A - 224 optimal antiderivatives

B - 9 more than twice size of optimal antiderivatives

C - 46 unnecessarily complex antiderivatives

D - 4 unable to integrate problems

E - 10 integration timeouts