Mathematica 11.3 Integration Test Results

on the problems in the test-suite directory "7 Inverse hyperbolic functions\7.2 Inverse hyperbolic cosine"

Test results for the 166 problems in "7.2.2 (d x)^m (a+b arccosh(c x))^n.m"

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

$$\int \frac{\mathrm{ArcCosh}[a x]^4}{x^2} \, dx$$

Optimal (type 4, 150 leaves, 11 steps):

$$-\frac{\mathrm{ArcCosh}[a x]^4}{x} + 8 a \, \mathrm{ArcCosh}[a x]^3 \, \mathrm{ArcTan}\left[e^{\mathrm{ArcCosh}[a x]}\right] - 12 i a \, \mathrm{ArcCosh}[a x]^2 \, \mathrm{PolyLog}\left[2, -i e^{\mathrm{ArcCosh}[a x]}\right] + 12 i a \, \mathrm{ArcCosh}[a x]^2 \, \mathrm{PolyLog}\left[2, i e^{\mathrm{ArcCosh}[a x]}\right] + 24 i a \, \mathrm{ArcCosh}[a x] \, \mathrm{PolyLog}\left[3, -i e^{\mathrm{ArcCosh}[a x]}\right] - 24 i a \, \mathrm{ArcCosh}[a x] \, \mathrm{PolyLog}\left[3, i e^{\mathrm{ArcCosh}[a x]}\right] - 24 i a \, \mathrm{PolyLog}\left[4, -i e^{\mathrm{ArcCosh}[a x]}\right] + 24 i a \, \mathrm{PolyLog}\left[4, i e^{\mathrm{ArcCosh}[a x]}\right]$$

Result (type 4, 478 leaves):

$$a \Bigg(-\frac{7 i \pi^4}{16} + \frac{1}{2} \pi^3 \mathrm{ArcCosh}[a x] - \frac{3}{2} i \pi^2 \mathrm{ArcCosh}[a x]^2 - 2 \pi \, \mathrm{ArcCosh}[a x]^3 + i \, \mathrm{ArcCosh}[a x]^4 - \frac{\mathrm{ArcCosh}[a x]^4}{a x} + \frac{1}{2} \pi^3 \mathrm{Log}\left[1 + i e^{-\mathrm{ArcCosh}[a x]}\right] -$$
$$3 i \pi^2 \mathrm{ArcCosh}[a x] \, \mathrm{Log}\left[1 + i e^{-\mathrm{ArcCosh}[a x]}\right] - 6 \pi \, \mathrm{ArcCosh}[a x]^2 \, \mathrm{Log}\left[1 + i e^{-\mathrm{ArcCosh}[a x]}\right] + 4 i \, \mathrm{ArcCosh}[a x]^3 \, \mathrm{Log}\left[1 + i e^{-\mathrm{ArcCosh}[a x]}\right] +$$
$$3 i \pi^2 \mathrm{ArcCosh}[a x] \, \mathrm{Log}\left[1 - i e^{\mathrm{ArcCosh}[a x]}\right] + 6 \pi \, \mathrm{ArcCosh}[a x]^2 \, \mathrm{Log}\left[1 - i e^{\mathrm{ArcCosh}[a x]}\right] - \frac{1}{2} \pi^3 \mathrm{Log}\left[1 + i e^{\mathrm{ArcCosh}[a x]}\right] -$$
$$4 i \, \mathrm{ArcCosh}[a x]^3 \, \mathrm{Log}\left[1 + i e^{\mathrm{ArcCosh}[a x]}\right] + \frac{1}{2} \pi^3 \mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{4} \left(\pi + 2 i \, \mathrm{ArcCosh}[a x]\right)\right]\right] + 3 i \left(\pi - 2 i \, \mathrm{ArcCosh}[a x]\right)^2 \mathrm{PolyLog}\left[2, -i e^{-\mathrm{ArcCosh}[a x]}\right] -$$
$$12 i \, \mathrm{ArcCosh}[a x]^2 \, \mathrm{PolyLog}\left[2, -i e^{\mathrm{ArcCosh}[a x]}\right] + 3 i \pi^2 \mathrm{PolyLog}\left[2, i e^{\mathrm{ArcCosh}[a x]}\right] + 12 \pi \, \mathrm{ArcCosh}[a x] \, \mathrm{PolyLog}\left[2, i e^{\mathrm{ArcCosh}[a x]}\right] +$$
$$12 \pi \, \mathrm{PolyLog}\left[3, -i e^{-\mathrm{ArcCosh}[a x]}\right] - 24 i \, \mathrm{ArcCosh}[a x] \, \mathrm{PolyLog}\left[3, -i e^{-\mathrm{ArcCosh}[a x]}\right] + 24 i \, \mathrm{ArcCosh}[a x] \, \mathrm{PolyLog}\left[3, -i e^{\mathrm{ArcCosh}[a x]}\right] -$$
$$12 \pi \, \mathrm{PolyLog}\left[3, i e^{\mathrm{ArcCosh}[a x]}\right] - 24 i \, \mathrm{PolyLog}\left[4, -i e^{-\mathrm{ArcCosh}[a x]}\right] - 24 i \, \mathrm{PolyLog}\left[4, -i e^{\mathrm{ArcCosh}[a x]}\right] \Bigg)$$

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

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

Optimal (type 4, 268 leaves, 19 steps):

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

Result (type 4, 595 leaves):

$$a^3 \left(\frac{1}{2} i \left(8 + \pi^2 - 4 i \pi \text{ArcCosh}[a x] - 4 \text{ArcCosh}[a x]^2\right) \text{PolyLog}\left[2, -i e^{-\text{ArcCosh}[a x]}\right] - \right.$$

$$\frac{1}{96} i \left(7 \pi^4 + 8 i \pi^3 \text{ArcCosh}[a x] + 24 \pi^2 \text{ArcCosh}[a x]^2 + \frac{192 i \text{ArcCosh}[a x]^2}{a x} - 32 i \pi \text{ArcCosh}[a x]^3 + \right.$$

$$\frac{64 i \sqrt{\frac{-1+a x}{1+a x}} (1 + a x) \text{ArcCosh}[a x]^3}{a^2 x^2} - 16 \text{ArcCosh}[a x]^4 - \frac{32 i \text{ArcCosh}[a x]^4}{a^3 x^3} - 384 \text{ArcCosh}[a x] \text{Log}\left[1 - i e^{-\text{ArcCosh}[a x]}\right] +$$
$$8 i \pi^3 \text{Log}\left[1 + i e^{-\text{ArcCosh}[a x]}\right] + 384 \text{ArcCosh}[a x] \text{Log}\left[1 + i e^{-\text{ArcCosh}[a x]}\right] + 48 \pi^2 \text{ArcCosh}[a x] \text{Log}\left[1 + i e^{-\text{ArcCosh}[a x]}\right] -$$
$$96 i \pi \text{ArcCosh}[a x]^2 \text{Log}\left[1 + i e^{-\text{ArcCosh}[a x]}\right] - 64 \text{ArcCosh}[a x]^3 \text{Log}\left[1 + i e^{-\text{ArcCosh}[a x]}\right] - 48 \pi^2 \text{ArcCosh}[a x] \text{Log}\left[1 - i e^{\text{ArcCosh}[a x]}\right] +$$
$$96 i \pi \text{ArcCosh}[a x]^2 \text{Log}\left[1 - i e^{\text{ArcCosh}[a x]}\right] - 8 i \pi^3 \text{Log}\left[1 + i e^{\text{ArcCosh}[a x]}\right] + 64 \text{ArcCosh}[a x]^3 \text{Log}\left[1 + i e^{\text{ArcCosh}[a x]}\right] +$$
$$8 i \pi^3 \text{Log}\left[\text{Tan}\left[\frac{1}{4} (\pi + 2 i \text{ArcCosh}[a x])\right]\right] + 384 \text{PolyLog}\left[2, i e^{-\text{ArcCosh}[a x]}\right] + 192 \text{ArcCosh}[a x]^2 \text{PolyLog}\left[2, -i e^{\text{ArcCosh}[a x]}\right] -$$
$$48 \pi^2 \text{PolyLog}\left[2, i e^{\text{ArcCosh}[a x]}\right] + 192 i \pi \text{ArcCosh}[a x] \text{PolyLog}\left[2, i e^{\text{ArcCosh}[a x]}\right] + 192 i \pi \text{PolyLog}\left[3, -i e^{-\text{ArcCosh}[a x]}\right] +$$
$$384 \text{ArcCosh}[a x] \text{PolyLog}\left[3, -i e^{-\text{ArcCosh}[a x]}\right] - 384 \text{ArcCosh}[a x] \text{PolyLog}\left[3, -i e^{\text{ArcCosh}[a x]}\right] -$$
$$\left.\left. 192 i \pi \text{PolyLog}\left[3, i e^{\text{ArcCosh}[a x]}\right] + 384 \text{PolyLog}\left[4, -i e^{-\text{ArcCosh}[a x]}\right] + 384 \text{PolyLog}\left[4, -i e^{\text{ArcCosh}[a x]}\right] \right)\right)$$

Problem 117: Unable to integrate problem.

$$\int x^m \text{ArcCosh}[a x]^2 \, dx$$

Optimal (type 5, 154 leaves, 2 steps):

$$\frac{x^{1+m} \text{ArcCosh}[a x]^2}{1 + m} - \frac{2 a x^{2+m} \sqrt{1 - a x} \text{ArcCosh}[a x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, a^2 x^2\right]}{(2 + 3 m + m^2) \sqrt{-1 + a x}} -$$
$$\frac{2 a^2 x^{3+m} \text{HypergeometricPFQ}\left[\left\{1, \frac{3}{2} + \frac{m}{2}, \frac{3}{2} + \frac{m}{2}\right\}, \left\{2 + \frac{m}{2}, \frac{5}{2} + \frac{m}{2}\right\}, a^2 x^2\right]}{6 + 11 m + 6 m^2 + m^3}$$

Result (type 8, 12 leaves):

$$\int x^m \operatorname{ArcCosh}[a x]^2 \, dx$$

Problem 118: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int x^m \operatorname{ArcCosh}[a x] \, dx$$

Optimal (type 5, 91 leaves, 4 steps):

$$\frac{x^{1+m} \operatorname{ArcCosh}[a x]}{1+m} - \frac{a x^{2+m} \sqrt{1-a^2 x^2} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, a^2 x^2\right]}{\left(2+3 m+m^2\right) \sqrt{-1+a x} \sqrt{1+a x}}$$

Result (type 6, 329 leaves):

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

Problem 163: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 5, 128 leaves, 2 steps):

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

Result (type 5, 256 leaves) :

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

Problem 164: Unable to integrate problem.

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

Optimal (type 5, 181 leaves, 2 steps) :

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

Result (type 8, 18 leaves):

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

Problem 165: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 5, 106 leaves, 4 steps):

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

Result (type 6, 337 leaves):

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

Test results for the 569 problems in "7.2.4 (f x)^m (d+e x^2)^p (a+b arccosh(c x))^n.m"

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

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

Optimal (type 4, 61 leaves, 7 steps):

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

Result (type 4, 124 leaves):

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

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

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

Optimal (type 4, 116 leaves, 9 steps):

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

Result (type 4, 243 leaves):

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

$$4 b\,\text{ArcCosh}[c x]\,\text{Log}\left[1+e^{-2\,\text{ArcCosh}[c x]}\right]-4 b\,\text{ArcCosh}[c x]\,\text{Log}\left[1-e^{-\text{ArcCosh}[c x]}\right]-4 b\,\text{ArcCosh}[c x]\,\text{Log}\left[1+e^{-\text{ArcCosh}[c x]}\right]+$$

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

Problem 119: Unable to integrate problem.

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

Optimal (type 3, 84 leaves, 2 steps):

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

Result (type 8, 26 leaves):

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

Problem 121: Unable to integrate problem.

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

Optimal (type 3, 158 leaves, 5 steps):

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

Result (type 8, 29 leaves):

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

Problem 123: Unable to integrate problem.

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

Optimal (type 3, 250 leaves, 5 steps):

$$-\frac{b\,c\,\sqrt{d-c^2\,d\,x^2}}{6\,d^2\,x^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-\frac{a+b\,\text{ArcCosh}[c\,x]}{3\,d\,x^3\,\sqrt{d-c^2\,d\,x^2}}-\frac{4\,c^2\,\left(a+b\,\text{ArcCosh}[c\,x]\right)}{3\,d\,x\,\sqrt{d-c^2\,d\,x^2}}+\frac{8\,c^4\,x\,\left(a+b\,\text{ArcCosh}[c\,x]\right)}{3\,d\,\sqrt{d-c^2\,d\,x^2}}+\frac{5\,b\,c^3\,\sqrt{d-c^2\,d\,x^2}\,\text{Log}[x]}{3\,d^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{b\,c^3\,\sqrt{d-c^2\,d\,x^2}\,\text{Log}\left[1-c^2\,x^2\right]}{2\,d^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}$$

Result (type 8, 29 leaves):

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

Problem 127: Unable to integrate problem.

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

Optimal (type 3, 133 leaves, 5 steps):

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

Result (type 8, 29 leaves):

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

Problem 129: Unable to integrate problem.

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

Optimal (type 3, 162 leaves, 5 steps):

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

Result (type 8, 26 leaves):

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

Problem 131: Unable to integrate problem.

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

Optimal (type 3, 248 leaves, 5 steps):

$$-\frac{b\,c\,\sqrt{d-c^2\,d\,x^2}}{6\,d^3\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(1-c^2\,x^2\right)}-\frac{a+b\,\text{ArcCosh}[c\,x]}{d\,x\,\left(d-c^2\,d\,x^2\right)^{3/2}}+\frac{4\,c^2\,x\,\left(a+b\,\text{ArcCosh}[c\,x]\right)}{3\,d\,\left(d-c^2\,d\,x^2\right)^{3/2}}+\frac{8\,c^2\,x\,\left(a+b\,\text{ArcCosh}[c\,x]\right)}{3\,d^2\,\sqrt{d-c^2\,d\,x^2}}+\frac{b\,c\,\sqrt{d-c^2\,d\,x^2}\,\text{Log}[x]}{d^3\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{5\,b\,c\,\sqrt{d-c^2\,d\,x^2}\,\text{Log}\left[1-c^2\,x^2\right]}{6\,d^3\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}$$

Result (type 8, 29 leaves):

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

Problem 133: Unable to integrate problem.

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

Optimal (type 3, 338 leaves, 5 steps):

$$-\frac{b\,c\,\sqrt{d-c^2\,d\,x^2}}{6\,d^3\,x^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-\frac{b\,c^3\,\sqrt{d-c^2\,d\,x^2}}{6\,d^3\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\left(1-c^2\,x^2\right)}-\frac{a+b\,\text{ArcCosh}[c\,x]}{3\,d\,x^3\,\left(d-c^2\,d\,x^2\right)^{3/2}}-\frac{2\,c^2\,\left(a+b\,\text{ArcCosh}[c\,x]\right)}{d\,x\,\left(d-c^2\,d\,x^2\right)^{3/2}}+\frac{8\,c^4\,x\,\left(a+b\,\text{ArcCosh}[c\,x]\right)}{3\,d\,\left(d-c^2\,d\,x^2\right)^{3/2}}+\frac{16\,c^4\,x\,\left(a+b\,\text{ArcCosh}[c\,x]\right)}{3\,d^2\,\sqrt{d-c^2\,d\,x^2}}+\frac{8\,b\,c^3\,\sqrt{d-c^2\,d\,x^2}\,\text{Log}[x]}{3\,d^3\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{4\,b\,c^3\,\sqrt{d-c^2\,d\,x^2}\,\text{Log}\left[1-c^2\,x^2\right]}{3\,d^3\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}$$

Result (type 8, 29 leaves):

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

Problem 143: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 5, 98 leaves, 1 step):

$$\frac{2 (f x)^{5/2} (a + b \operatorname{ArcCosh}[c x]) \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{5}{4}, \frac{9}{4}, c^2 x^2\right]}{5 f} + \frac{4 b c (f x)^{7/2} \sqrt{-1 + c x} \operatorname{HypergeometricPFQ}\left[\left\{1, \frac{7}{4}, \frac{7}{4}\right\}, \left\{\frac{9}{4}, \frac{11}{4}\right\}, c^2 x^2\right]}{35 f^2 \sqrt{1 - c x}}$$

Result (type 5, 230 leaves):

$$\frac{1}{36 c^2 \sqrt{1 - c^2 x^2}} f \sqrt{f x} \left(\frac{24 i a \sqrt{1 - \frac{1}{c^2 x^2}} \sqrt{x} \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\frac{\sqrt{-\frac{1}{c}}}{\sqrt{x}}\right], -1\right]}{\sqrt{-\frac{1}{c}}} + \right.$$

$$8 (1 + c x) \left(-3 a + 3 a c x - 2 b c x \sqrt{\frac{-1 + c x}{1 + c x}} + 3 b (-1 + c x) \operatorname{ArcCosh}[c x] - 3 b (-1 + c x) \operatorname{ArcCosh}[c x] \operatorname{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{5}{4}, c^2 x^2\right]\right) +$$

$$\left. \frac{3 \sqrt{2} b c \pi x \sqrt{\frac{-1+c x}{1+c x}} (1 + c x) \operatorname{HypergeometricPFQ}\left[\left\{\frac{3}{4}, \frac{3}{4}, 1\right\}, \left\{\frac{5}{4}, \frac{7}{4}\right\}, c^2 x^2\right]}{\operatorname{Gamma}\left[\frac{5}{4}\right] \operatorname{Gamma}\left[\frac{7}{4}\right]} \right)$$

Problem 144: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 5, 141 leaves, 1 step):

$$\frac{2 (f x)^{5/2} \sqrt{1 - c^2 x^2} (a + b \operatorname{ArcCosh}[c x]) \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{5}{4}, \frac{9}{4}, c^2 x^2\right]}{5 f \sqrt{d - c^2 d x^2}} +$$

$$\frac{4 b c (f x)^{7/2} \sqrt{-1 + c x} \sqrt{1 + c x} \operatorname{HypergeometricPFQ}\left[\left\{1, \frac{7}{4}, \frac{7}{4}\right\}, \left\{\frac{9}{4}, \frac{11}{4}\right\}, c^2 x^2\right]}{35 f^2 \sqrt{d - c^2 d x^2}}$$

Result (type 5, 241 leaves):

$$\frac{1}{36\,c^2\sqrt{d-c^2 d x^2}\,\text{Gamma}\left[\frac{5}{4}\right]\text{Gamma}\left[\frac{7}{4}\right]} f\sqrt{f x}\left(8\,\text{Gamma}\left[\frac{5}{4}\right]\text{Gamma}\left[\frac{7}{4}\right]\left(\frac{3\,i\,a\sqrt{1-\frac{1}{c^2x^2}}\sqrt{x}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{-\frac{1}{c}}}{\sqrt{x}}\right],-1\right]}{\sqrt{-\frac{1}{c}}}+(1+c x)\left(-3a+3acx-2bcx\sqrt{\frac{-1+cx}{1+cx}}+3b(-1+cx)\,\text{ArcCosh}[c x]-3b(-1+cx)\,\text{ArcCosh}[c x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{5}{4},c^2x^2\right]\right)\right)+3\sqrt{2}\,b\,c\,\pi\,x\sqrt{\frac{-1+cx}{1+cx}}(1+cx)\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},c^2x^2\right]\right)$$

Problem 145: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 5, 429 leaves, 8 steps):

$$-\frac{b c d^3\left(2271+1329 m+284 m^2+27 m^3+m^4\right)(f x)^{2+m}\left(1-c^2x^2\right)}{f^2(3+m)^2(5+m)^2(7+m)^2\sqrt{-1+cx}\sqrt{1+cx}}+\frac{b c^3 d^3(9+m)(13+2m)(f x)^{4+m}\left(1-c^2x^2\right)}{f^4(5+m)^2(7+m)^2\sqrt{-1+cx}\sqrt{1+cx}}-\frac{b c^5 d^3(f x)^{6+m}\left(1-c^2x^2\right)}{f^6(7+m)^2\sqrt{-1+cx}\sqrt{1+cx}}+\frac{d^3(f x)^{1+m}(a+b\,\text{ArcCosh}[c x])}{f(1+m)}-\frac{3c^2d^3(f x)^{3+m}(a+b\,\text{ArcCosh}[c x])}{f^3(3+m)}+\frac{3c^4d^3(f x)^{5+m}(a+b\,\text{ArcCosh}[c x])}{f^5(5+m)}-\frac{c^6d^3(f x)^{7+m}(a+b\,\text{ArcCosh}[c x])}{f^7(7+m)}-\frac{3bcd^3\left(2161+1813m+455m^2+35m^3\right)(f x)^{2+m}\sqrt{1-c^2x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},c^2x^2\right]}{f^2(1+m)(2+m)(3+m)^2(5+m)^2(7+m)^2\sqrt{-1+cx}\sqrt{1+cx}}$$

Result (type 6, 3439 leaves) :

$$\frac{a\,d^3\,x\,(f\,x)^m}{1+m}-\frac{3\,a\,c^2\,d^3\,x^3\,(f\,x)^m}{3+m}+\frac{3\,a\,c^4\,d^3\,x^5\,(f\,x)^m}{5+m}-\frac{a\,c^6\,d^3\,x^7\,(f\,x)^m}{7+m}+\frac{1}{c}b\,d^3\,(c\,x)^{-m}\,(f\,x)^m$$

$$\left(-\frac{1}{1+m}12\,(c\,x)^m\left(\left(\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(6\,\text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.\right.\right.$$

$$\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)-$$

$$\left(\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(6\,\text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+(-1+c\,x)\right.$$

$$\left.\left.\left.\left(4\,m\,\text{AppellF1}\left[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]-\text{AppellF1}\left[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)\right)+\frac{(c\,x)^{1+m}\,\text{ArcCosh}[c\,x]}{1+m}\right)-$$

$$3\,b\,c\,d^3\,x^2\,(c\,x)^{-2-m}\,(f\,x)^m\left(-\frac{1}{3+m}4\,(c\,x)^m\left(\left(3\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\right.\right.$$

$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$

$$\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)-$$

$$\left(3\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(6\,\text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$

$$\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]-\text{AppellF1}\left[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)+$$

$$(-1+c\,x)^{3/2}\sqrt{1+c\,x}\left(\left(5\,\text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(30\,\text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+3\right.\right.$$

$$\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)+$$

$$\left(7\,(-1+c\,x)\,\text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(70\,\text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+5\right.$$

$$\left.\left.\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)\right)\right)+$$

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

$$\Bigg(6\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$(-1+c\,x)\,\Bigg(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Bigg)-$$

$$\Bigg(12\,(c\,x)^m\,\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Big/\Bigg(6\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$4\,m\,(-1+c\,x)\,\text{AppellF1}\Big[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]-(-1+c\,x)\,\text{AppellF1}\Big[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)+$$

$$\Bigg(40\,(c\,x)^m\,(-1+c\,x)^{3/2}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Big/\Bigg(30\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$3\,(-1+c\,x)\,\Bigg(4\,m\,\text{AppellF1}\Big[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Bigg)+$$

$$\Bigg(112\,(c\,x)^m\,(-1+c\,x)^{5/2}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Big/\Bigg(70\,\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$5\,(-1+c\,x)\,\Bigg(4\,m\,\text{AppellF1}\Big[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Bigg)+$$

$$\Bigg(108\,(c\,x)^m\,(-1+c\,x)^{7/2}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Big/$$

$$\Bigg(7\,\Bigg(18\,\text{AppellF1}\Big[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$(-1+c\,x)\,\Bigg(4\,m\,\text{AppellF1}\Big[\frac{9}{2},1-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{9}{2},-m,\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(44\,(c\,x)^m\,(-1+c\,x)^{9/2}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Big/$$

$$\Bigg(9\,\Bigg(22\,\text{AppellF1}\Big[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+(-1+c\,x)\,\Bigg(4\,m\,\text{AppellF1}\Big[\frac{11}{2},1-m,-\frac{1}{2},\frac{13}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$\text{AppellF1}\Big[\frac{11}{2},-m,\frac{1}{2},\frac{13}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Bigg)\Bigg)\Bigg)+\frac{(c\,x)^{5+m}\,\text{ArcCosh}[c\,x]}{5+m}\Bigg)-b\,c^5\,d^3\,x^6\,(c\,x)^{-6-m}\,(f\,x)^m$$

$$\Bigg(-\frac{1}{7+m}\Bigg(\Bigg(12\,(c\,x)^m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Big/\Bigg(6\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$(-1+c\,x)\,\Bigg(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Bigg)-$$

$$\left(12\,(c\,x)^m\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(6\,\text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$

$$\left.4\,m\,(-1+c\,x)\,\text{AppellF1}\left[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]-(-1+c\,x)\,\text{AppellF1}\left[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)+$$

$$\left(60\,(c\,x)^m(-1+c\,x)^{3/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(30\,\text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$

$$\left.3\,(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)+$$

$$\left(252\,(c\,x)^m(-1+c\,x)^{5/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(70\,\text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$

$$\left.5\,(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)+$$

$$\left(468\,(c\,x)^m(-1+c\,x)^{7/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/$$

$$\left(7\left(18\,\text{AppellF1}\left[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.\right.$$

$$\left.\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{9}{2},1-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{9}{2},-m,\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)\right)+$$

$$\left(484\,(c\,x)^m(-1+c\,x)^{9/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/$$

$$\left(9\left(22\,\text{AppellF1}\left[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.\right.$$

$$\left.\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{11}{2},1-m,-\frac{1}{2},\frac{13}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{11}{2},-m,\frac{1}{2},\frac{13}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)\right)+$$

$$\left(260\,(c\,x)^m(-1+c\,x)^{11/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{11}{2},-m,-\frac{1}{2},\frac{13}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/$$

$$\left(11\left(26\,\text{AppellF1}\left[\frac{11}{2},-m,-\frac{1}{2},\frac{13}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.\right.$$

$$\left.\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{13}{2},1-m,-\frac{1}{2},\frac{15}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{13}{2},-m,\frac{1}{2},\frac{15}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)\right)+$$

$$\left(60\,(c\,x)^m(-1+c\,x)^{13/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{13}{2},-m,-\frac{1}{2},\frac{15}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/$$

$$\left(13\left(30\,\text{AppellF1}\left[\frac{13}{2},-m,-\frac{1}{2},\frac{15}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{15}{2},1-m,-\frac{1}{2},\frac{17}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.\right.\right.$$

$$\left.\left.\left.\left.\text{AppellF1}\left[\frac{15}{2},-m,\frac{1}{2},\frac{17}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)\right)\right)+\frac{(c\,x)^{7+m}\,\text{ArcCosh}[c\,x]}{7+m}\Bigg)$$

Problem 146: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 5, 307 leaves, 7 steps):

$$-\frac{b c d^2 \left(38+13 m+m^2\right) (f x)^{2+m} \left(1-c^2 x^2\right)}{f^2 (3+m)^2 (5+m)^2 \sqrt{-1+c x} \sqrt{1+c x}}+\frac{b c^3 d^2 (f x)^{4+m} \left(1-c^2 x^2\right)}{f^4 (5+m)^2 \sqrt{-1+c x} \sqrt{1+c x}}+\frac{d^2 (f x)^{1+m} (a+b\,\text{ArcCosh}[c x])}{f (1+m)}-\frac{2 c^2 d^2 (f x)^{3+m} (a+b\,\text{ArcCosh}[c x])}{f^3 (3+m)}+\frac{c^4 d^2 (f x)^{5+m} (a+b\,\text{ArcCosh}[c x])}{f^5 (5+m)}-\frac{b c d^2 \left(149+100 m+15 m^2\right) (f x)^{2+m} \sqrt{1-c^2 x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},c^2 x^2\right]}{f^2 (1+m) (2+m) (3+m)^2 (5+m)^2 \sqrt{-1+c x} \sqrt{1+c x}}$$

Result (type 6, 2085 leaves):

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

$$\left(3\sqrt{\frac{-1+c\,x}{1+c\,x}}\ \text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(6\,\text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$
$$\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]-\text{AppellF1}\left[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)+$$
$$(-1+c\,x)^{3/2}\sqrt{1+c\,x}\left(\left(5\,\text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(30\,\text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+3\right.\right.$$
$$\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)+$$
$$\left(7(-1+c\,x)\,\text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(70\,\text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+5\right.$$
$$\left.\left.\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)\right)\right)+$$

$$\left.\frac{(c\,x)^{3+m}\,\text{ArcCosh}[c\,x]}{3+m}\right)+b\,c^3\,d^2\,x^4\,(c\,x)^{-4-m}\,(f\,x)^m\left(-\frac{1}{5+m}\left(\left(12\,(c\,x)^m\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\right.\right.$$
$$\left(6\,\text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$
$$\left.(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)-$$
$$\left(12\,(c\,x)^m\sqrt{\frac{-1+c\,x}{1+c\,x}}\ \text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(6\,\text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$
$$\left.4\,m\,(-1+c\,x)\,\text{AppellF1}\left[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]-(-1+c\,x)\,\text{AppellF1}\left[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)+$$
$$\left(40\,(c\,x)^m\,(-1+c\,x)^{3/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(30\,\text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$
$$\left.3(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)+$$
$$\left(112\,(c\,x)^m\,(-1+c\,x)^{5/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/\left(70\,\text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.$$
$$\left.5(-1+c\,x)\left(4\,m\,\text{AppellF1}\left[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\text{AppellF1}\left[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\right)+$$
$$\left(108\,(c\,x)^m\,(-1+c\,x)^{7/2}\sqrt{1+c\,x}\,\text{AppellF1}\left[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]\right)\Big/$$
$$\left(7\left(18\,\text{AppellF1}\left[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\right]+\right.\right.$$

$$(-1+c x)\left(4 m\,\text{AppellF1}\left[\frac{9}{2},1-m,-\frac{1}{2},\frac{11}{2},1-c x,\frac{1}{2}(1-c x)\right]+\text{AppellF1}\left[\frac{9}{2},-m,\frac{1}{2},\frac{11}{2},1-c x,\frac{1}{2}(1-c x)\right]\right)\Bigg)\Bigg)+$$
$$\left(44 (c x)^m (-1+c x)^{9/2}\sqrt{1+c x}\,\text{AppellF1}\left[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c x,\frac{1}{2}(1-c x)\right]\right)\Big/$$
$$\Bigg(9\Bigg(22\,\text{AppellF1}\left[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c x,\frac{1}{2}(1-c x)\right]+(-1+c x)\Bigg(4 m\,\text{AppellF1}\left[\frac{11}{2},1-m,-\frac{1}{2},\frac{13}{2},1-c x,\frac{1}{2}(1-c x)\right]+$$
$$\text{AppellF1}\left[\frac{11}{2},-m,\frac{1}{2},\frac{13}{2},1-c x,\frac{1}{2}(1-c x)\right]\Bigg)\Bigg)\Bigg)+\frac{(c x)^{5+m}\,\text{ArcCosh}[c x]}{5+m}\Bigg)$$

Problem 147: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 5, 184 leaves, 6 steps):

$$\frac{b c d (f x)^{2+m}\sqrt{-1+c x}\sqrt{1+c x}}{f^2 (3+m)^2}+\frac{d (f x)^{1+m}(a+b\,\text{ArcCosh}[c x])}{f (1+m)}-$$
$$\frac{c^2 d (f x)^{3+m}(a+b\,\text{ArcCosh}[c x])}{f^3 (3+m)}-\frac{b c d (7+3 m)(f x)^{2+m}\sqrt{1-c^2 x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},c^2 x^2\right]}{f^2 (1+m)(2+m)(3+m)^2\sqrt{-1+c x}\sqrt{1+c x}}$$

Result (type 6, 1047 leaves):

$$
\begin{aligned}
&\frac{a\,d\,x\,(f\,x)^m}{1+m}-\frac{a\,c^2\,d\,x^3\,(f\,x)^m}{3+m}+\frac{1}{c}b\,d\,(c\,x)^{-m}\,(f\,x)^m\\
&\quad\Bigg(-\frac{1}{1+m}12\,(c\,x)^m\Bigg(\Big(\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big/\Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\\
&\qquad(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big)-\\
&\qquad\Big(\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big/\Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+(-1+c\,x)\\
&\qquad\Big(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]-\text{AppellF1}\Big[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big)\Bigg)+\frac{(c\,x)^{1+m}\,\text{ArcCosh}[c\,x]}{1+m}\Bigg)-\\
&b\,c\,d\,x^2\,(c\,x)^{-2-m}\,(f\,x)^m\Bigg(-\frac{1}{3+m}4\,(c\,x)^m\Bigg(\Big(3\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big/\\
&\qquad\Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\\
&\qquad(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big)-\\
&\qquad\Big(3\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big/\Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\\
&\qquad(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]-\text{AppellF1}\Big[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big)+\\
&\qquad(-1+c\,x)^{3/2}\sqrt{1+c\,x}\,\Big(\Big(5\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big/\Big(30\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+3\\
&\qquad(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big)+\Big(7\,(-1+c\,x)\\
&\qquad\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big/\Big(70\,\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+5\,(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\\
&\qquad\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Big)\Big)\Big)\Bigg)+\frac{(c\,x)^{3+m}\,\text{ArcCosh}[c\,x]}{3+m}\Bigg)
\end{aligned}
$$

Problem 151: Unable to integrate problem.

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

Optimal (type 5, 723 leaves, 11 steps):

$$-\frac{b c d^2 (f x)^{2+m} \sqrt{d-c^2 d x^2}}{f^2 (2+m) (6+m) \sqrt{-1+c x} \sqrt{1+c x}}-\frac{15 b c d^2 (f x)^{2+m} \sqrt{d-c^2 d x^2}}{f^2 (2+m)^2 (4+m) (6+m) \sqrt{-1+c x} \sqrt{1+c x}}-\frac{5 b c d^2 (f x)^{2+m} \sqrt{d-c^2 d x^2}}{f^2 (2+m) (4+m) (6+m) \sqrt{-1+c x} \sqrt{1+c x}}+\frac{5 b c^3 d^2 (f x)^{4+m} \sqrt{d-c^2 d x^2}}{f^4 (4+m)^2 (6+m) \sqrt{-1+c x} \sqrt{1+c x}}+\frac{2 b c^3 d^2 (f x)^{4+m} \sqrt{d-c^2 d x^2}}{f^4 (4+m) (6+m) \sqrt{-1+c x} \sqrt{1+c x}}-\frac{b c^5 d^2 (f x)^{6+m} \sqrt{d-c^2 d x^2}}{f^6 (6+m)^2 \sqrt{-1+c x} \sqrt{1+c x}}+\frac{15 d^2 (f x)^{1+m} \sqrt{d-c^2 d x^2} (a+b \operatorname{ArcCosh}[c x])}{f (6+m) \left(8+6 m+m^2\right)}+\frac{5 d (f x)^{1+m} \left(d-c^2 d x^2\right)^{3/2} (a+b \operatorname{ArcCosh}[c x])}{f (4+m) (6+m)}+\frac{(f x)^{1+m} \left(d-c^2 d x^2\right)^{5/2} (a+b \operatorname{ArcCosh}[c x])}{f (6+m)}+\frac{15 d^2 (f x)^{1+m} \sqrt{d-c^2 d x^2} (a+b \operatorname{ArcCosh}[c x]) \operatorname{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},c^2 x^2\right]}{f (4+m) (6+m) \left(2+3 m+m^2\right) \sqrt{1-c x} \sqrt{1+c x}}-\frac{15 b c d^2 (f x)^{2+m} \sqrt{d-c^2 d x^2} \operatorname{HypergeometricPFQ}\left[\left\{1,1+\frac{m}{2},1+\frac{m}{2}\right\},\left\{\frac{3}{2}+\frac{m}{2},2+\frac{m}{2}\right\},c^2 x^2\right]}{f^2 (1+m) (2+m)^2 (4+m) (6+m) \sqrt{-1+c x} \sqrt{1+c x}}$$

Result (type 8, 31 leaves):

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

Problem 152: Unable to integrate problem.

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

Optimal (type 5, 455 leaves, 7 steps):

$$-\frac{3\,b\,c\,d\,(f\,x)^{2+m}\sqrt{d-c^2\,d\,x^2}}{f^2\,(2+m)^2\,(4+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-\frac{b\,c\,d\,(f\,x)^{2+m}\sqrt{d-c^2\,d\,x^2}}{f^2\,(2+m)\,(4+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{b\,c^3\,d\,(f\,x)^{4+m}\sqrt{d-c^2\,d\,x^2}}{f^4\,(4+m)^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{3\,d\,(f\,x)^{1+m}\sqrt{d-c^2\,d\,x^2}\,(a+b\,\text{ArcCosh}[c\,x])}{f\,(8+6\,m+m^2)}+\frac{(f\,x)^{1+m}\,(d-c^2\,d\,x^2)^{3/2}\,(a+b\,\text{ArcCosh}[c\,x])}{f\,(4+m)}+\frac{3\,d\,(f\,x)^{1+m}\sqrt{d-c^2\,d\,x^2}\,(a+b\,\text{ArcCosh}[c\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},c^2\,x^2\right]}{f\,(4+m)\,(2+3\,m+m^2)\,\sqrt{1-c\,x}\,\sqrt{1+c\,x}}-\frac{3\,b\,c\,d\,(f\,x)^{2+m}\sqrt{d-c^2\,d\,x^2}\,\text{HypergeometricPFQ}\left[\left\{1,1+\frac{m}{2},1+\frac{m}{2}\right\},\left\{\frac{3}{2}+\frac{m}{2},2+\frac{m}{2}\right\},c^2\,x^2\right]}{f^2\,(1+m)\,(2+m)^2\,(4+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}$$

Result (type 8, 31 leaves):

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

Problem 153: Unable to integrate problem.

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

Optimal (type 5, 278 leaves, 3 steps):

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

Result (type 8, 31 leaves):

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

Problem 154: Unable to integrate problem.

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

Optimal (type 5, 176 leaves, 1 step):

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

Result (type 9, 202 leaves):

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

Problem 155: Unable to integrate problem.

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

Optimal (type 5, 300 leaves, 4 steps):

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

Result (type 8, 31 leaves):

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

Problem 156: Unable to integrate problem.

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

Optimal (type 5, 450 leaves, 7 steps):

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

Result (type 8, 31 leaves):

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

Problem 157: Unable to integrate problem.

$$\int (f x)^m (d1 + c\, d1\, x)^{5/2} (d2 - c\, d2\, x)^{5/2} (a + b \text{ArcCosh}[c x]) \, dx$$

Optimal (type 5, 817 leaves, 11 steps):

$$-\frac{b\,c\,d1^2\,d2^2\,(f\,x)^{2+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^2\,(2+m)\,(6+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-\frac{15\,b\,c\,d1^2\,d2^2\,(f\,x)^{2+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^2\,(2+m)^2\,(4+m)\,(6+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-$$
$$\frac{5\,b\,c\,d1^2\,d2^2\,(f\,x)^{2+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^2\,(2+m)\,(4+m)\,(6+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{5\,b\,c^3\,d1^2\,d2^2\,(f\,x)^{4+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^4\,(4+m)^2\,(6+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{2\,b\,c^3\,d1^2\,d2^2\,(f\,x)^{4+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^4\,(4+m)\,(6+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-$$
$$\frac{b\,c^5\,d1^2\,d2^2\,(f\,x)^{6+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^6\,(6+m)^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{15\,d1^2\,d2^2\,(f\,x)^{1+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}\,(a+b\,\text{ArcCosh}[c\,x])}{f\,(6+m)\,(8+6\,m+m^2)}+$$
$$\frac{5\,d1\,d2\,(f\,x)^{1+m}\,(d1+c\,d1\,x)^{3/2}\,(d2-c\,d2\,x)^{3/2}\,(a+b\,\text{ArcCosh}[c\,x])}{f\,(4+m)\,(6+m)}+\frac{(f\,x)^{1+m}\,(d1+c\,d1\,x)^{5/2}\,(d2-c\,d2\,x)^{5/2}\,(a+b\,\text{ArcCosh}[c\,x])}{f\,(6+m)}+$$
$$\left(15\,d1^2\,d2^2\,(f\,x)^{1+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}\,(a+b\,\text{ArcCosh}[c\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},c^2\,x^2\right]\right)\Big/$$
$$\left(f\,(4+m)\,(6+m)\,(2+3\,m+m^2)\,\sqrt{1-c\,x}\,\sqrt{1+c\,x}\right)-$$
$$\left(15\,b\,c\,d1^2\,d2^2\,(f\,x)^{2+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}\,\text{HypergeometricPFQ}\left[\left\{1,1+\frac{m}{2},1+\frac{m}{2}\right\},\left\{\frac{3}{2}+\frac{m}{2},2+\frac{m}{2}\right\},c^2\,x^2\right]\right)\Big/$$
$$\left(f^2\,(1+m)\,(2+m)^2\,(4+m)\,(6+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)$$

Result (type 8, 37 leaves):

$$\int (f\,x)^m\,(d1+c\,d1\,x)^{5/2}\,(d2-c\,d2\,x)^{5/2}\,(a+b\,\text{ArcCosh}[c\,x])\,dx$$

Problem 158: Unable to integrate problem.

$$\int (f\,x)^m\,(d1+c\,d1\,x)^{3/2}\,(d2-c\,d2\,x)^{3/2}\,(a+b\,\text{ArcCosh}[c\,x])\,dx$$

Optimal (type 5, 503 leaves, 7 steps):

$$-\frac{3\,b\,c\,d1\,d2\,(f\,x)^{2+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^2\,(2+m)^2\,(4+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}-\frac{b\,c\,d1\,d2\,(f\,x)^{2+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^2\,(2+m)\,(4+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{b\,c^3\,d1\,d2\,(f\,x)^{4+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}{f^4\,(4+m)^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+$$
$$\frac{3\,d1\,d2\,(f\,x)^{1+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}\,(a+b\,\text{ArcCosh}[c\,x])}{f\,(8+6\,m+m^2)}+\frac{(f\,x)^{1+m}\,(d1+c\,d1\,x)^{3/2}\,(d2-c\,d2\,x)^{3/2}\,(a+b\,\text{ArcCosh}[c\,x])}{f\,(4+m)}+$$
$$\frac{3\,d1\,d2\,(f\,x)^{1+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}\,(a+b\,\text{ArcCosh}[c\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},c^2\,x^2\right]}{f\,(4+m)\,(2+3\,m+m^2)\,\sqrt{1-c\,x}\,\sqrt{1+c\,x}}-$$
$$\left(3\,b\,c\,d1\,d2\,(f\,x)^{2+m}\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}\,\text{HypergeometricPFQ}\left[\left\{1,1+\frac{m}{2},1+\frac{m}{2}\right\},\left\{\frac{3}{2}+\frac{m}{2},2+\frac{m}{2}\right\},c^2\,x^2\right]\right)\Big/$$
$$\left(f^2\,(1+m)\,(2+m)^2\,(4+m)\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)$$

Result (type 8, 37 leaves):

$$\int (f x)^m (d1 + c\, d1\, x)^{3/2} (d2 - c\, d2\, x)^{3/2} (a + b\, \text{ArcCosh}[c\, x])\, dx$$

Problem 159: Unable to integrate problem.

$$\int (f x)^m \sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}\, (a + b\, \text{ArcCosh}[c\, x])\, dx$$

Optimal (type 5, 302 leaves, 3 steps):

$$-\frac{b\, c\, (f x)^{2+m} \sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}}{f^2 (2+m)^2 \sqrt{-1 + c\, x}\, \sqrt{1 + c\, x}} + \frac{(f x)^{1+m} \sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}\, (a + b\, \text{ArcCosh}[c\, x])}{f (2+m)} + \frac{(f x)^{1+m} \sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}\, (a + b\, \text{ArcCosh}[c\, x])\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, c^2 x^2\right]}{f (2 + 3 m + m^2) \sqrt{1 - c\, x}\, \sqrt{1 + c\, x}} - \frac{b\, c\, (f x)^{2+m} \sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}\, \text{HypergeometricPFQ}\left[\left\{1, 1 + \frac{m}{2}, 1 + \frac{m}{2}\right\}, \left\{\frac{3}{2} + \frac{m}{2}, 2 + \frac{m}{2}\right\}, c^2 x^2\right]}{f^2 (1+m) (2+m)^2 \sqrt{-1 + c\, x}\, \sqrt{1 + c\, x}}$$

Result (type 8, 37 leaves):

$$\int (f x)^m \sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}\, (a + b\, \text{ArcCosh}[c\, x])\, dx$$

Problem 160: Unable to integrate problem.

$$\int \frac{(f x)^m (a + b\, \text{ArcCosh}[c\, x])}{\sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}}\, dx$$

Optimal (type 5, 188 leaves, 1 step):

$$\frac{(f x)^{1+m} \sqrt{1 - c^2 x^2}\, (a + b\, \text{ArcCosh}[c\, x])\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, c^2 x^2\right]}{f (1+m) \sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}} + \frac{b\, c\, (f x)^{2+m} \sqrt{-1 + c\, x}\, \sqrt{1 + c\, x}\, \text{HypergeometricPFQ}\left[\left\{1, 1 + \frac{m}{2}, 1 + \frac{m}{2}\right\}, \left\{\frac{3}{2} + \frac{m}{2}, 2 + \frac{m}{2}\right\}, c^2 x^2\right]}{f^2 (1+m) (2+m) \sqrt{d1 + c\, d1\, x}\, \sqrt{d2 - c\, d2\, x}}$$

Result (type 9, 322 leaves):

$$-\frac{1}{8\,c\,d1\,\sqrt{d2-c\,d2\,x}}(f\,x)^m\sqrt{d1+c\,d1\,x}\left(-\left(\left(8\,a\,(-1+m)\,(1+c\,x)\,\text{AppellF1}\left[-m,-m,\frac{1}{2},1-m,\frac{1}{1+c\,x},\frac{2}{1+c\,x}\right]\right)\Big/\left(m\left(m\,\text{AppellF1}\left[1-m,1-m,\frac{1}{2},2-m,\frac{1}{1+c\,x},\frac{2}{1+c\,x}\right]-\text{AppellF1}\left[1-m,-m,\frac{3}{2},2-m,\frac{1}{1+c\,x},\frac{2}{1+c\,x}\right]+(-1+m)\,(1+c\,x)\,\text{AppellF1}\left[-m,-m,\frac{1}{2},1-m,\frac{1}{1+c\,x},\frac{2}{1+c\,x}\right]\right)\right)\right)+b\left(\frac{4\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{ArcCosh}[c\,x]\,\text{Hypergeometric2F1}\left[1,\frac{2+m}{2},\frac{3+m}{2},c^2x^2\right]}{1+m}-\frac{2^{-m}\,c\,\sqrt{\pi}\,x\,\text{Gamma}[1+m]\,\text{HypergeometricPFQRegularized}\left[\left\{1,\frac{2+m}{2},\frac{2+m}{2}\right\},\left\{\frac{3+m}{2},\frac{4+m}{2}\right\},c^2x^2\right]}{1+c\,x}\right)\text{Sinh}[2\,\text{ArcCosh}[c\,x]]\right)$$

Problem 161: Unable to integrate problem.

$$\int\frac{(f\,x)^m\,(a+b\,\text{ArcCosh}[c\,x])}{(d1+c\,d1\,x)^{3/2}\,(d2-c\,d2\,x)^{3/2}}\,dx$$

Optimal (type 5, 336 leaves, 4 steps):

$$\frac{(f\,x)^{1+m}\,(a+b\,\text{ArcCosh}[c\,x])}{d1\,d2\,f\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}-\frac{m\,(f\,x)^{1+m}\sqrt{1-c^2x^2}\,(a+b\,\text{ArcCosh}[c\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},c^2x^2\right]}{d1\,d2\,f\,(1+m)\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}+$$
$$\frac{b\,c\,(f\,x)^{2+m}\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{Hypergeometric2F1}\left[1,\frac{2+m}{2},\frac{4+m}{2},c^2x^2\right]}{d1\,d2\,f^2\,(2+m)\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}-$$
$$\frac{b\,c\,m\,(f\,x)^{2+m}\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{HypergeometricPFQ}\left[\left\{1,1+\frac{m}{2},1+\frac{m}{2}\right\},\left\{\frac{3}{2}+\frac{m}{2},2+\frac{m}{2}\right\},c^2x^2\right]}{d1\,d2\,f^2\,(1+m)\,(2+m)\,\sqrt{d1+c\,d1\,x}\,\sqrt{d2-c\,d2\,x}}$$

Result (type 8, 37 leaves):

$$\int \frac{(f x)^m (a + b \text{ArcCosh}[c x])}{(d1 + c\, d1\, x)^{3/2} (d2 - c\, d2\, x)^{3/2}} \, dx$$

Problem 162: Unable to integrate problem.

$$\int \frac{(f x)^m (a + b \text{ArcCosh}[c x])}{(d1 + c\, d1\, x)^{5/2} (d2 - c\, d2\, x)^{5/2}} \, dx$$

Optimal (type 5, 504 leaves, 7 steps):

$$\frac{(f x)^{1+m} (a + b \text{ArcCosh}[c x])}{3\, d1\, d2\, f\, (d1 + c\, d1\, x)^{3/2} (d2 - c\, d2\, x)^{3/2}} + \frac{(2 - m) (f x)^{1+m} (a + b \text{ArcCosh}[c x])}{3\, d1^2\, d2^2\, f \sqrt{d1 + c\, d1\, x} \sqrt{d2 - c\, d2\, x}} -$$
$$\frac{(2 - m)\, m\, (f x)^{1+m} \sqrt{1 - c^2 x^2}\, (a + b \text{ArcCosh}[c x])\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, c^2 x^2\right]}{3\, d1^2\, d2^2\, f\, (1 + m) \sqrt{d1 + c\, d1\, x} \sqrt{d2 - c\, d2\, x}} +$$
$$\frac{b\, c\, (2 - m) (f x)^{2+m} \sqrt{-1 + c x} \sqrt{1 + c x}\, \text{Hypergeometric2F1}\left[1, \frac{2+m}{2}, \frac{4+m}{2}, c^2 x^2\right]}{3\, d1^2\, d2^2\, f^2\, (2 + m) \sqrt{d1 + c\, d1\, x} \sqrt{d2 - c\, d2\, x}} +$$
$$\frac{b\, c\, (f x)^{2+m} \sqrt{-1 + c x} \sqrt{1 + c x}\, \text{Hypergeometric2F1}\left[2, \frac{2+m}{2}, \frac{4+m}{2}, c^2 x^2\right]}{3\, d1^2\, d2^2\, f^2\, (2 + m) \sqrt{d1 + c\, d1\, x} \sqrt{d2 - c\, d2\, x}} -$$
$$\frac{b\, c\, (2 - m)\, m\, (f x)^{2+m} \sqrt{-1 + c x} \sqrt{1 + c x}\, \text{HypergeometricPFQ}\left[\left\{1, 1 + \frac{m}{2}, 1 + \frac{m}{2}\right\}, \left\{\frac{3}{2} + \frac{m}{2}, 2 + \frac{m}{2}\right\}, c^2 x^2\right]}{3\, d1^2\, d2^2\, f^2\, (1 + m) (2 + m) \sqrt{d1 + c\, d1\, x} \sqrt{d2 - c\, d2\, x}}$$

Result (type 8, 37 leaves):

$$\int \frac{(f x)^m (a + b \text{ArcCosh}[c x])}{(d1 + c\, d1\, x)^{5/2} (d2 - c\, d2\, x)^{5/2}} \, dx$$

Problem 163: Unable to integrate problem.

$$\int \frac{(f x)^m \text{ArcCosh}[a x]}{\sqrt{1 - a^2 x^2}} \, dx$$

Optimal (type 5, 128 leaves, 1 step):

$$\frac{(f x)^{1+m} \text{ArcCosh}[a x]\, \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, a^2 x^2\right]}{f\, (1 + m)} + \frac{a\, (f x)^{2+m} \sqrt{-1 + a x}\, \text{HypergeometricPFQ}\left[\left\{1, 1 + \frac{m}{2}, 1 + \frac{m}{2}\right\}, \left\{\frac{3}{2} + \frac{m}{2}, 2 + \frac{m}{2}\right\}, a^2 x^2\right]}{f^2\, (1 + m) (2 + m) \sqrt{1 - a x}}$$

Result (type 9, 164 leaves):

$$-\frac{1}{2\sqrt{-(-1+a x)(1+a x)}}x(f x)^m\sqrt{\frac{-1+a x}{1+a x}}(1+a x)\left(\frac{2\sqrt{\frac{-1+a x}{1+a x}}(1+a x)\,\text{ArcCosh}[a x]\,\text{Hypergeometric2F1}\left[1,1+\frac{m}{2},\frac{3+m}{2},a^2 x^2\right]}{1+m}-\right.$$

$$\left.2^{-1-m}a\sqrt{\pi}\,x\,\text{Gamma}[1+m]\,\text{HypergeometricPFQRegularized}\left[\left\{1,1+\frac{m}{2},1+\frac{m}{2}\right\},\left\{\frac{3+m}{2},2+\frac{m}{2}\right\},a^2 x^2\right]\right)$$

Problem 176: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 427 leaves, 12 steps):

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

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

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

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

Result (type 4, 5160 leaves):

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

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

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

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

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

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

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

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

$$\mathbb{i}\,\text{ArcCosh}[c x]^2\ \text{Log}\left[1-\mathbb{i}\ e^{-\text{ArcCosh}[c x]}\right]+\mathbb{i}\,\text{ArcCosh}[c x]^2\ \text{Log}\left[1+\mathbb{i}\ e^{-\text{ArcCosh}[c x]}\right]-$$

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

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

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

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

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

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

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

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

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

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

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

$$\left.\left.\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]^2-$$

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

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

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

$$2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

$$\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

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

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

$$\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

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

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\left(\frac{1}{2}+\frac{\mathrm{i}}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[\frac{1}{2}\left((1+\mathrm{i})+(1-\mathrm{i})\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\frac{1}{2}\left((1+\mathrm{i})+(1-\mathrm{i})\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\frac{(1+\mathrm{i})\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{\mathrm{i}+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{Log}\left[\frac{1}{2}\left((1+\mathrm{i})+(1-\mathrm{i})\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

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

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

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

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

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

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

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

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

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

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

$$\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$\text{Log}\left[\frac{(1-\mathbb{i})\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$\text{Log}\left[\frac{(1+\mathbb{i})\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

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

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

$$\text{Log}\left[\frac{(1+\mathbb{i})\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

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

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

$$\text{Log}\left[\frac{(1+\mathbb{i})\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$2\,\text{PolyLog}\left[3,\,-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]+2\,\text{PolyLog}\left[3,\,i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\Bigg)\Bigg)\Bigg)\Bigg)$$

Problem 184: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 630 leaves, 18 steps):

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

Result (type 4, 5484 leaves):

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

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

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

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

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

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

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

$$i\left(\text{ArcCosh}[c\,x]^2\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c\,x]}\right]-\text{ArcCosh}[c\,x]^2\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c\,x]}\right]+2\,\text{ArcCosh}[c\,x]\,\text{PolyLog}\left[2,-i\,e^{-\text{ArcCosh}[c\,x]}\right]-\right.$$

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

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

$$i\, d \sqrt{\frac{-1+c x}{1+c x}}\, (1+c x) \Big(4\, i\, \text{ArcTan}\big[\text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big] + \text{ArcCosh}[c x]^2 \,\text{Log}\big[1 - i\, e^{-\text{ArcCosh}[c x]}\big] - \text{ArcCosh}[c x]^2 \,\text{Log}\big[1 + i\, e^{-\text{ArcCosh}[c x]}\big] -$$

$$4\, i\, \text{ArcCosh}[c x]\, \text{ArcTan}\big[\text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\big[1 - i\, e^{2 i \text{ArcTan}[\text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]]}\big] + 4\, i\, \text{ArcCosh}[c x]\, \text{ArcTan}\big[\text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]$$

$$\text{Log}\big[1 + i\, e^{2 i \text{ArcTan}[\text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]]}\big] + 2\, \text{Log}\Big[i \Big(c x + \sqrt{\frac{-1+c x}{1+c x}}\, (1+c x)\Big)\Big]^2 \text{Log}\Big[\frac{1}{1 - \text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]}\Big] -$$

$$2\, \text{Log}\Big[-i \Big(c x + \sqrt{\frac{-1+c x}{1+c x}}\, (1+c x)\Big)\Big]^2 \text{Log}\Big[-\frac{2}{-1 + \text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]}\Big] - 4\, i\, \text{ArcTan}\big[\text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\big[$$

$$1 - \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\big[-1 + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big] + 4\, i\, \text{ArcTan}\big[\text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\big[-1 + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]^2 -$$

$$2\, \text{Log}\Big[-i \Big(c x + \sqrt{\frac{-1+c x}{1+c x}}\, (1+c x)\Big)\Big]^2 \text{Log}\Big[\Big(\frac{1}{2} + \frac{i}{2}\Big) \Big(-i + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\Big)\Big] + 2\, \text{Log}\big[1 - \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]$$

$$\text{Log}\big[-1 + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\Big[\Big(\frac{1}{2} + \frac{i}{2}\Big) \Big(-i + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\Big)\Big] - 2\, \text{Log}\big[-1 + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]^2$$

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

$$4\, i\, \text{ArcTan}\big[\text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\big[1 - \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\Big[\frac{(1-i)\left(-1 + \text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]\right)}{i + \text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]}\Big] -$$

$$4\, i\, \text{ArcTan}\big[\text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\big[-1 + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\Big[\frac{(1-i)\left(-1 + \text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]\right)}{i + \text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]}\Big] +$$

$$2\, \text{Log}\big[-1 + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\big]\, \text{Log}\Big[\Big(\frac{1}{2} + \frac{i}{2}\Big) \Big(-i + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\Big)\Big]\, \text{Log}\Big[\frac{(1-i)\left(-1 + \text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]\right)}{i + \text{Tanh}[\frac{1}{2}\text{ArcCosh}[c x]]}\Big] +$$

$$2\, \text{Log}\Big[i \Big(c x + \sqrt{\frac{-1+c x}{1+c x}}\, (1+c x)\Big)\Big]^2 \text{Log}\Big[(1-i) \Big(i + \text{Tanh}\big[\tfrac{1}{2}\text{ArcCosh}[c x]\big]\Big)\Big] -$$

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

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

$$4\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

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

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

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$4\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$2\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

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

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

$$2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$2\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 192: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 890 leaves, 28 steps):

$$-\frac{170}{27} b^2 c^2 d^2 \sqrt{d-c^2 d x^2}+\frac{5}{27} b^2 c^4 d^2 x^2 \sqrt{d-c^2 d x^2}+\frac{5 a b c^3 d^2 x \sqrt{d-c^2 d x^2}}{\sqrt{-1+c x} \sqrt{1+c x}}+$$

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

$$\frac{b c d^2 \sqrt{d-c^2 d x^2} (a+b \, \text{ArcCosh}[c x])}{x \sqrt{-1+c x} \sqrt{1+c x}}-\frac{b c^3 d^2 x \sqrt{d-c^2 d x^2} (a+b \, \text{ArcCosh}[c x])}{3 \sqrt{-1+c x} \sqrt{1+c x}}-\frac{2 b c^5 d^2 x^3 \sqrt{d-c^2 d x^2} (a+b \, \text{ArcCosh}[c x])}{9 \sqrt{-1+c x} \sqrt{1+c x}}-$$

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

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

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

$$\frac{5 i b^2 c^2 d^2 \sqrt{d-c^2 d x^2} \, \text{PolyLog}\left[3,-i e^{\text{ArcCosh}[c x]}\right]}{\sqrt{-1+c x} \sqrt{1+c x}}-\frac{5 i b^2 c^2 d^2 \sqrt{d-c^2 d x^2} \, \text{PolyLog}\left[3,i e^{\text{ArcCosh}[c x]}\right]}{\sqrt{-1+c x} \sqrt{1+c x}}$$

Result (type 4, 5734 leaves) :

$$\sqrt{-d \left(-1+c^2 x^2\right)} \left(-\frac{7}{3} a^2 c^2 d^2-\frac{a^2 d^2}{2 x^2}+\frac{1}{3} a^2 c^4 d^2 x^2\right)-\frac{1}{18 \sqrt{\frac{-1+c x}{1+c x}} (1+c x)}$$

$$a b c^2 d^2 \sqrt{-d (-1+c x) (1+c x)} \left(-9 c x-12 \left(\frac{-1+c x}{1+c x}\right)^{3/2} (1+c x)^3 \, \text{ArcCosh}[c x]+\text{Cosh}[3 \, \text{ArcCosh}[c x]]\right)+\frac{1}{54} b^2 c^2 d^2 \sqrt{-d (-1+c x) (1+c x)}$$

$$\left(-26+\frac{27 c x \, \text{ArcCosh}[c x]}{\sqrt{\frac{-1+c x}{1+c x}} (1+c x)}-9 \, \text{ArcCosh}[c x]^2+\left(2+9 \, \text{ArcCosh}[c x]^2\right) \text{Cosh}[2 \, \text{ArcCosh}[c x]]-\frac{3 \, \text{ArcCosh}[c x] \, \text{Cosh}[3 \, \text{ArcCosh}[c x]]}{\sqrt{\frac{-1+c x}{1+c x}} (1+c x)}\right)-$$

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

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

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

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

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

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

$$i\left(\text{ArcCosh}[c\,x]^2\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c\,x]}\right]-\text{ArcCosh}[c\,x]^2\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c\,x]}\right]+2\,\text{ArcCosh}[c\,x]\,\text{PolyLog}\left[2,-i\,e^{-\text{ArcCosh}[c\,x]}\right]-\right.$$

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

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

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

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

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

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

$$1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\Big]\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]^2-$$

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

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

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

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

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

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

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

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

$$4\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

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

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

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$4\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$2\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

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

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

$$2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$2\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 199: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 53 leaves, 1 step):

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

Result (type 3, 147 leaves):

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

Problem 202: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 430 leaves, 12 steps):

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

Result (type 4, 5076 leaves) :

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

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

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

$$4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]$$

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

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

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

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

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

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

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

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

$$
\begin{aligned}
&4\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+\\
&4\,\text{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+\\
&4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+\\
&2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]^2-\\
&2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]^2+\\
&4\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+\\
&4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-\\
&2\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]^2+\\
&4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-\\
&2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-\\
&4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+\\
&4\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-\\
&2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-\\
&2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+\\
&2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-\\
&4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+\\
&2\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-
\end{aligned}
$$

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

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

$$2\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$2\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$4\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$2\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$2\,\text{Log}\left[\frac{(1-\mathbb{i})\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$2\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$2\,\text{Log}\left[\frac{(1+\mathbb{i})\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$2\,\text{Log}\left[\frac{(1-\mathbb{i})\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$2\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$2\,\text{Log}\left[\frac{(1+\mathbb{i})\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}+\frac{\mathbb{i}}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$2\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,\left(\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-2\,\text{Log}\left[\frac{(1-\mathbb{i})\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]$$

$$\text{PolyLog}\left[2,\,\left(\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+2\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,\left(\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$2\,\text{Log}\left[\frac{(1+\mathbb{i})\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{\mathbb{i}+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{PolyLog}\left[2,\,\left(\frac{1}{2}-\frac{\mathbb{i}}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

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

Problem 212: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 650 leaves, 27 steps):

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

Result (type 4, 5400 leaves):

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

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

$$3\,\text{ArcCosh}[cx]^2\,\text{Log}\left[1+\mathrm{i}\,e^{-\text{ArcCosh}[cx]}\right]-12\,\mathrm{i}\,\text{ArcCosh}[cx]\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[1-\mathrm{i}\,e^{2\,\mathrm{i}\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]}\right]+$$

$$12\,\mathrm{i}\,\text{ArcCosh}[cx]\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[1+\mathrm{i}\,e^{2\,\mathrm{i}\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]}\right]+6\,\text{Log}\left[\mathrm{i}\left(cx+\sqrt{\frac{-1+cx}{1+cx}}\,(1+cx)\right)\right]^2$$

$$\text{Log}\left[\frac{1}{1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]}\right]-6\,\text{Log}\left[-\mathrm{i}\left(cx+\sqrt{\frac{-1+cx}{1+cx}}\,(1+cx)\right)\right]^2\text{Log}\left[-\frac{2}{-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]}\right]-$$

$$12\,\mathrm{i}\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]+$$

$$12\,\mathrm{i}\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]^2-6\,\text{Log}\left[-\mathrm{i}\left(cx+\sqrt{\frac{-1+cx}{1+cx}}\,(1+cx)\right)\right]^2$$

$$\text{Log}\left[\left(\frac{1}{2}+\frac{\mathrm{i}}{2}\right)\left(-\mathrm{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right)\right]+6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]$$

$$\text{Log}\left[\left(\frac{1}{2}+\frac{\mathrm{i}}{2}\right)\left(-\mathrm{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right)\right]-6\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]^2\text{Log}\left[\left(\frac{1}{2}+\frac{\mathrm{i}}{2}\right)\left(-\mathrm{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right)\right]+$$

$$6\,\text{Log}\left[-\mathrm{i}\left(cx+\sqrt{\frac{-1+cx}{1+cx}}\,(1+cx)\right)\right]^2\text{Log}\left[\frac{(1-\mathrm{i})\left(-\mathrm{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right)}{-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]}\right]+$$

$$12\,\mathrm{i}\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[\frac{(1-\mathrm{i})\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right)}{\mathrm{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]}\right]-$$

$$12\,\mathrm{i}\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right]\text{Log}\left[\frac{(1-\mathrm{i})\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]\right)}{\mathrm{i}+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[cx]\right]}\right]+$$

$$6\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

$$6\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]^2\text{Log}\left[(1-i)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$6\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]^2\text{Log}\left[\frac{(1+i)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

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

$$12\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$12\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]^2-$$

$$6\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]^2+$$

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

$$12\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$6\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]^2+$$

$$12\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$12\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$12\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$6\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$6\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$12\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]+$$

$$6\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]-$$

$$12\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

$$12\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$6\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

$$6\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$6\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]^2\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$6\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$12\,\mathrm{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]\mathrm{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]-$$

$$12\,\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]\mathrm{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]^2\mathrm{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[\frac{(1+i)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}\right]\mathrm{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]-$$

$$12\,i\,\mathrm{ArcCosh}[c\,x]\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[1-\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]+$$

$$6\,\mathrm{ArcCosh}[c\,x]\,\mathrm{Log}\left[1-i\,e^{-\mathrm{ArcCosh}[c\,x]}\right]\mathrm{Log}\left[1-\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]-$$

$$6\,\mathrm{ArcCosh}[c\,x]\,\mathrm{Log}\left[1+i\,e^{-\mathrm{ArcCosh}[c\,x]}\right]\mathrm{Log}\left[1-\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]+$$

$$12\,i\,\mathrm{ArcCosh}[c\,x]\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[1+\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]-$$

$$6\,\mathrm{ArcCosh}[c\,x]\,\mathrm{Log}\left[1-i\,e^{-\mathrm{ArcCosh}[c\,x]}\right]\mathrm{Log}\left[1+\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]+$$

$$6\,\mathrm{ArcCosh}[c\,x]\,\mathrm{Log}\left[1+i\,e^{-\mathrm{ArcCosh}[c\,x]}\right]\mathrm{Log}\left[1+\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]+$$

$$6\left(\mathrm{Log}\left[1-\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]-\mathrm{Log}\left[1+\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]\right)\mathrm{PolyLog}\left[2,-i\,e^{-\mathrm{ArcCosh}[c\,x]}\right]-$$

$$6\left(\mathrm{Log}\left[1-\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]-\mathrm{Log}\left[1+\frac{i\,(1+c\,x)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]\right)\mathrm{PolyLog}\left[2,i\,e^{-\mathrm{ArcCosh}[c\,x]}\right]+$$

$$6\,\mathrm{ArcCosh}[c\,x]\,\mathrm{PolyLog}\left[2,-i\,e^{2\,i\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]}\right]+6\,\mathrm{Log}\left[1-\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{PolyLog}\left[2,-i\,e^{2\,i\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]}\right]-$$

$$6\,\mathrm{Log}\left[1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{PolyLog}\left[2,-i\,e^{2\,i\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]}\right]-6\,\mathrm{ArcCosh}[c\,x]\,\mathrm{PolyLog}\left[2,i\,e^{2\,i\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]}\right]-$$

$$6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\,i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]}\right]+6\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]$$

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

$$12\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\text{PolyLog}\left[2,\,-c\,x-\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right]+12\,\text{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]$$

$$\text{PolyLog}\left[2,\,-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]-12\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\text{PolyLog}\left[2,\,i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]+$$

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

$$6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$6\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$6\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$6\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$6\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

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

$$6\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$6\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$6\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

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

$$6\,\text{PolyLog}\left[3,i\,e^{-\text{ArcCosh}[c\,x]}\right]-12\,\text{PolyLog}\left[3,-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]+12\,\text{PolyLog}\left[3,i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\Bigg)\Bigg)+$$

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

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

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

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

$$2\,\text{ArcCosh}[c\,x]\,\text{Cosh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]^2+$$

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

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

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

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

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

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

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

Problem 222: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 796 leaves, 41 steps):

$$-\frac{b^2\,c^2}{3\,d^2\,\sqrt{d-c^2\,d\,x^2}}+\frac{b\,c\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,(a+b\,\text{ArcCosh}[c\,x])}{d^2\,x\,(1-c^2\,x^2)\,\sqrt{d-c^2\,d\,x^2}}-\frac{2\,b\,c^3\,x\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,(a+b\,\text{ArcCosh}[c\,x])}{3\,d^2\,(1-c^2\,x^2)\,\sqrt{d-c^2\,d\,x^2}}+\frac{5\,c^2\,(a+b\,\text{ArcCosh}[c\,x])^2}{6\,d\,(d-c^2\,d\,x^2)^{3/2}}-$$
$$\frac{(a+b\,\text{ArcCosh}[c\,x])^2}{2\,d\,x^2\,(d-c^2\,d\,x^2)^{3/2}}+\frac{5\,c^2\,(a+b\,\text{ArcCosh}[c\,x])^2}{2\,d^2\,\sqrt{d-c^2\,d\,x^2}}+\frac{5\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,(a+b\,\text{ArcCosh}[c\,x])^2\,\text{ArcTan}\left[e^{\text{ArcCosh}[c\,x]}\right]}{d^2\,\sqrt{d-c^2\,d\,x^2}}-$$
$$\frac{b^2\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{ArcTan}\left[\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right]}{d^2\,\sqrt{d-c^2\,d\,x^2}}+\frac{26\,b\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,(a+b\,\text{ArcCosh}[c\,x])\,\text{ArcTanh}\left[e^{\text{ArcCosh}[c\,x]}\right]}{3\,d^2\,\sqrt{d-c^2\,d\,x^2}}+$$
$$\frac{13\,b^2\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{PolyLog}\left[2,-e^{\text{ArcCosh}[c\,x]}\right]}{3\,d^2\,\sqrt{d-c^2\,d\,x^2}}-\frac{5\,i\,b\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,(a+b\,\text{ArcCosh}[c\,x])\,\text{PolyLog}\left[2,-i\,e^{\text{ArcCosh}[c\,x]}\right]}{d^2\,\sqrt{d-c^2\,d\,x^2}}+$$
$$\frac{5\,i\,b\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,(a+b\,\text{ArcCosh}[c\,x])\,\text{PolyLog}\left[2,i\,e^{\text{ArcCosh}[c\,x]}\right]}{d^2\,\sqrt{d-c^2\,d\,x^2}}-\frac{13\,b^2\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{PolyLog}\left[2,e^{\text{ArcCosh}[c\,x]}\right]}{3\,d^2\,\sqrt{d-c^2\,d\,x^2}}+$$
$$\frac{5\,i\,b^2\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{PolyLog}\left[3,-i\,e^{\text{ArcCosh}[c\,x]}\right]}{d^2\,\sqrt{d-c^2\,d\,x^2}}-\frac{5\,i\,b^2\,c^2\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{PolyLog}\left[3,i\,e^{\text{ArcCosh}[c\,x]}\right]}{d^2\,\sqrt{d-c^2\,d\,x^2}}$$

Result (type 4, 5568 leaves):

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

$$a\,b\,c^2\left(\frac{6\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)}{c x}+\frac{6\,(-1+c x)\,(1+c x)\,\text{ArcCosh}[c x]}{c^2 x^2}+26\,\text{ArcCosh}[c x]\,\text{Cosh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]^2-\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]-\right.$$

$$\text{ArcCosh}[c x]\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]^2-30\,i\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{ArcCosh}[c x]\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c x]}\right]+$$

$$30\,i\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{ArcCosh}[c x]\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c x]}\right]+26\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{Log}\left[\text{Cosh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]-$$

$$26\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{Log}\left[\text{Sinh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]-30\,i\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{PolyLog}\left[2,-i\,e^{-\text{ArcCosh}[c x]}\right]+30\,i\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)$$

$$\left.\text{PolyLog}\left[2,i\,e^{-\text{ArcCosh}[c x]}\right]-26\,\text{ArcCosh}[c x]\,\text{Sinh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]^2-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]-\text{ArcCosh}[c x]\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]^2\right)+$$

$$\frac{1}{d^2}b^2 c^2\left(-\frac{1}{2\sqrt{-d\,(-1+c x)\,(1+c x)}}\,i\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\left(-4\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]+5\,\text{ArcCosh}[c x]^2\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c x]}\right]-\right.\right.$$

$$5\,\text{ArcCosh}[c x]^2\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c x]}\right]-20\,i\,\text{ArcCosh}[c x]\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]\,\text{Log}\left[1-i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]}\right]+$$

$$20\,i\,\text{ArcCosh}[c x]\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]\,\text{Log}\left[1+i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]}\right]+10\,\text{Log}\left[i\left(c x+\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\right)\right]^2$$

$$\text{Log}\left[\frac{1}{1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}\right]-10\,\text{Log}\left[-i\left(c x+\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\right)\right]^2\,\text{Log}\left[-\frac{2}{-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}\right]-$$

$$20\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]+$$

$$20\,i\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]^2-10\,\mathrm{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]^2$$

$$\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]+10\,\mathrm{Log}\left[1-\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]$$

$$\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]-10\,\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]^2\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\mathrm{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]^2\mathrm{Log}\left[\frac{(1-i)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}\right]+$$

$$20\,i\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[1-\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[\frac{(1-i)\left(-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}\right]-$$

$$20\,i\,\mathrm{ArcTan}\left[\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[\frac{(1-i)\left(-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}\right]+$$

$$10\,\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]\mathrm{Log}\left[\frac{(1-i)\left(-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}\right]+$$

$$10\,\mathrm{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]^2\mathrm{Log}\left[(1-i)\left(i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\mathrm{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]^2\mathrm{Log}\left[\frac{(1+i)\left(i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}\right]-$$

$$20\,\mathrm{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\mathrm{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]\mathrm{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]-$$

$$20\,\mathrm{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]+$$

$$20\,\mathrm{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]\mathrm{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]+$$

$$20\,\mathrm{Log}\left[-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right]\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]\mathrm{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]^2-$$

$$10\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]^2+$$

$$20\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$20\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]^2+$$

$$20\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]-$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]-$$

$$20\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]+$$

$$20\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]-$$

$$10\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]-$$

$$10\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]+$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]-$$

$$20\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]+$$

$$10\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]-$$

$$20\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]+$$

$$20\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]-$$

$$10\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]+$$

$$10\,\text{Log}\left[\frac{1}{2}\left((1+i)-(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$10\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\left(i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]-$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]^2\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$20\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$20\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]^2\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{Log}\left[\frac{1}{2}\left((1+i)+(1-i)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$20\,i\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1-\frac{i\,(1+c\,x)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]+$$

$$10\,\text{ArcCosh}[c\,x]\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c\,x]}\right]\text{Log}\left[1-\frac{i\,(1+c\,x)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]-$$

$$10\,\text{ArcCosh}[c\,x]\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c\,x]}\right]\text{Log}\left[1-\frac{i\,(1+c\,x)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]+$$

$$20\,i\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{Log}\left[1+\frac{i\,(1+c\,x)\left(-i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]-$$

$$10\,\text{ArcCosh}[c\,x]\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c\,x]}\right]\,\text{Log}\left[1+\frac{i\,(1+c\,x)\,\left(-i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]+$$

$$10\,\text{ArcCosh}[c\,x]\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c\,x]}\right]\,\text{Log}\left[1+\frac{i\,(1+c\,x)\,\left(-i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]+$$

$$10\left(\text{Log}\left[1-\frac{i\,(1+c\,x)\,\left(-i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]-\text{Log}\left[1+\frac{i\,(1+c\,x)\,\left(-i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]\right)\,\text{PolyLog}\Big[2,$$

$$-i\,e^{-\text{ArcCosh}[c\,x]}\Big]-10\left(\text{Log}\left[1-\frac{i\,(1+c\,x)\,\left(-i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]-\text{Log}\left[1+\frac{i\,(1+c\,x)\,\left(-i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)^2}{2\,c\,x}\right]\right)$$

$$\text{PolyLog}\left[2,\,i\,e^{-\text{ArcCosh}[c\,x]}\right]+10\,\text{ArcCosh}[c\,x]\,\text{PolyLog}\left[2,\,-i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]}\right]+$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,-i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]}\right]-10\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]$$

$$\text{PolyLog}\left[2,\,-i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]}\right]-10\,\text{ArcCosh}[c\,x]\,\text{PolyLog}\left[2,\,i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]}\right]-$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]}\right]+10\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]$$

$$\text{PolyLog}\left[2,\,i\,e^{2\,i\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]}\right]-20\,\text{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\,\text{PolyLog}\left[2,\,-c\,x-\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right]+$$

$$20\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\,\text{PolyLog}\left[2,\,-c\,x-\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right]+20\,\text{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]$$

$$\text{PolyLog}\left[2,\,-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]-20\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\,\text{PolyLog}\left[2,\,i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]+$$

$$20\,\text{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right]\,\text{PolyLog}\left[2,\,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}-\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$20\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(-\frac{1}{2}+\frac{i}{2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$20\,\text{Log}\left[-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}-\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$20\,\text{Log}\left[i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[1-\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]+$$

$$10\,\text{Log}\left[\frac{(1-i)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-$$

$$10\,\text{Log}\left[\frac{(1+i)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{i+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}\right]\text{PolyLog}\left[2,\left(\frac{1}{2}+\frac{i}{2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)\right]-10\,\text{PolyLog}\left[3,-i\,e^{-\text{ArcCosh}[c\,x]}\right]+$$

$$10\,\text{PolyLog}\left[3,i\,e^{-\text{ArcCosh}[c\,x]}\right]-20\,\text{PolyLog}\left[3,-i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]+20\,\text{PolyLog}\left[3,i\left(c\,x+\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\right)\right]+$$

$$\frac{1}{12\sqrt{-d\,(-1+c\,x)\,(1+c\,x)}}\left(\frac{12\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\text{ArcCosh}[c\,x]}{c\,x}+\frac{6\,(-1+c\,x)\,(1+c\,x)\,\text{ArcCosh}[c\,x]^2}{c^2\,x^2}-\right.$$

$$4\,\text{Cosh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]^2+26\,\text{ArcCosh}[c\,x]^2\,\text{Cosh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]^2-2\,\text{ArcCosh}[c\,x]\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]-$$

$$\text{ArcCosh}[c\,x]^2\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]^2-52\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\text{ArcCosh}[c\,x]\,\text{Log}\left[1-e^{-\text{ArcCosh}[c\,x]}\right]+$$

$$52\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\text{ArcCosh}[c\,x]\,\text{Log}\left[1+e^{-\text{ArcCosh}[c\,x]}\right]-52\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\text{PolyLog}\left[2,-e^{-\text{ArcCosh}[c\,x]}\right]+$$

$$52\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\text{PolyLog}\left[2,e^{-\text{ArcCosh}[c\,x]}\right]+4\,\text{Sinh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]^2-26\,\text{ArcCosh}[c\,x]^2\,\text{Sinh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]^2-$$

$$\left.\left.2\,\text{ArcCosh}[c\,x]\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]-\text{ArcCosh}[c\,x]^2\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]^2\right)\right)$$

Problem 250: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 241 leaves, 7 steps):

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

Result (type 4, 212 leaves):

$$-\left(\left(i\,\pi^3\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)-8\,a\,x\,\text{ArcCosh}[a\,x]^3-8\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)\,\text{ArcCosh}[a\,x]^3+\right.\right.$$
$$24\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)\,\text{ArcCosh}[a\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcCosh}[a\,x]}\right]+24\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)\,\text{ArcCosh}[a\,x]\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcCosh}[a\,x]}\right]-$$
$$\left.\left.12\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcCosh}[a\,x]}\right]\right)\Big/\left(8\,a\,c\,\sqrt{-c\,(-1+a\,x)\,(1+a\,x)}\right)\right)$$

Problem 251: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcCosh}[a\,x]^3}{\left(c-a^2\,c\,x^2\right)^{5/2}}\,dx$$

Optimal (type 4, 413 leaves, 12 steps):

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

Result (type 4, 258 leaves):

$$\frac{1}{12\,a\,c^2\,\sqrt{c-a^2\,c\,x^2}}\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)$$

$$\left(-i\,\pi^3-\frac{12\,a\,x\,\sqrt{\frac{-1+a\,x}{1+a\,x}}\,\text{ArcCosh}[a\,x]}{-1+a\,x}+\frac{6\,\text{ArcCosh}[a\,x]^2}{1-a^2\,x^2}+8\,\text{ArcCosh}[a\,x]^3+\frac{8\,a\,x\,\sqrt{\frac{-1+a\,x}{1+a\,x}}\,\text{ArcCosh}[a\,x]^3}{-1+a\,x}-\frac{4\,a\,x\,\left(\frac{-1+a\,x}{1+a\,x}\right)^{3/2}\,\text{ArcCosh}[a\,x]^3}{(-1+a\,x)^3}-\right.$$

$$\left.24\,\text{ArcCosh}[a\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcCosh}[a\,x]}\right]+12\,\text{Log}\left[\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)\right]-24\,\text{ArcCosh}[a\,x]\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcCosh}[a\,x]}\right]+12\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcCosh}[a\,x]}\right]\right)$$

Problem 252: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcCosh}[a\,x]^3}{\left(c-a^2\,c\,x^2\right)^{7/2}}\,dx$$

Optimal (type 4, 607 leaves, 20 steps):

$$-\frac{\sqrt{-1+a\,x}\,\sqrt{1+a\,x}}{20\,a\,c^3\,\left(1-a^2\,x^2\right)\,\sqrt{c-a^2\,c\,x^2}}-\frac{x\,\text{ArcCosh}[a\,x]}{c^3\,\sqrt{c-a^2\,c\,x^2}}-\frac{x\,\text{ArcCosh}[a\,x]}{10\,c^3\,(1-a\,x)\,(1+a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{3\,\sqrt{-1+a\,x}\,\sqrt{1+a\,x}\,\text{ArcCosh}[a\,x]^2}{20\,a\,c^3\,\left(1-a^2\,x^2\right)^2\,\sqrt{c-a^2\,c\,x^2}}+$$

$$\frac{2\,\sqrt{-1+a\,x}\,\sqrt{1+a\,x}\,\text{ArcCosh}[a\,x]^2}{5\,a\,c^3\,\left(1-a^2\,x^2\right)\,\sqrt{c-a^2\,c\,x^2}}+\frac{x\,\text{ArcCosh}[a\,x]^3}{5\,c\,\left(c-a^2\,c\,x^2\right)^{5/2}}+\frac{4\,x\,\text{ArcCosh}[a\,x]^3}{15\,c^2\,\left(c-a^2\,c\,x^2\right)^{3/2}}+\frac{8\,x\,\text{ArcCosh}[a\,x]^3}{15\,c^3\,\sqrt{c-a^2\,c\,x^2}}+$$

$$\frac{8\,\sqrt{-1+a\,x}\,\sqrt{1+a\,x}\,\text{ArcCosh}[a\,x]^3}{15\,a\,c^3\,\sqrt{c-a^2\,c\,x^2}}-\frac{8\,\sqrt{-1+a\,x}\,\sqrt{1+a\,x}\,\text{ArcCosh}[a\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcCosh}[a\,x]}\right]}{5\,a\,c^3\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{-1+a\,x}\,\sqrt{1+a\,x}\,\text{Log}\left[1-a^2\,x^2\right]}{2\,a\,c^3\,\sqrt{c-a^2\,c\,x^2}}-$$

$$\frac{8\,\sqrt{-1+a\,x}\,\sqrt{1+a\,x}\,\text{ArcCosh}[a\,x]\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcCosh}[a\,x]}\right]}{5\,a\,c^3\,\sqrt{c-a^2\,c\,x^2}}+\frac{4\,\sqrt{-1+a\,x}\,\sqrt{1+a\,x}\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcCosh}[a\,x]}\right]}{5\,a\,c^3\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 363 leaves):

$$-\frac{1}{60\,a\,c^3\sqrt{c-a^2\,c\,x^2}}\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)$$

$$\left(4\,i\,\pi^3+\frac{3}{1-a^2\,x^2}+\frac{60\,a\,x\,\sqrt{\frac{-1+a\,x}{1+a\,x}}\,\text{ArcCosh}[a\,x]}{-1+a\,x}-\frac{6\,a\,x\,\left(\frac{-1+a\,x}{1+a\,x}\right)^{3/2}\,\text{ArcCosh}[a\,x]}{(-1+a\,x)^3}-\frac{9\,\text{ArcCosh}[a\,x]^2}{\left(-1+a^2\,x^2\right)^2}+\frac{24\,\text{ArcCosh}[a\,x]^2}{-1+a^2\,x^2}-32\,\text{ArcCosh}[a\,x]^3-\right.$$

$$\frac{32\,a\,x\,\sqrt{\frac{-1+a\,x}{1+a\,x}}\,\text{ArcCosh}[a\,x]^3}{-1+a\,x}+\frac{16\,a\,x\,\left(\frac{-1+a\,x}{1+a\,x}\right)^{3/2}\,\text{ArcCosh}[a\,x]^3}{(-1+a\,x)^3}-\frac{12\,a\,x\,\sqrt{\frac{-1+a\,x}{1+a\,x}}\,\text{ArcCosh}[a\,x]^3}{(-1+a\,x)^3\,(1+a\,x)^2}+96\,\text{ArcCosh}[a\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcCosh}[a\,x]}\right]-$$

$$\left.60\,\text{Log}\left[\sqrt{\frac{-1+a\,x}{1+a\,x}}\,(1+a\,x)\right]+96\,\text{ArcCosh}[a\,x]\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcCosh}[a\,x]}\right]-48\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcCosh}[a\,x]}\right]\right)$$

Problem 260: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{ArcCosh}[a\,x]^3}{x^3\,\sqrt{1-a^2\,x^2}}\,dx$$

Optimal (type 4, 460 leaves, 18 steps):

$$\frac{3\,a\,\sqrt{-1+a\,x}\,\text{ArcCosh}[a\,x]^2}{2\,x\,\sqrt{1-a\,x}}-\frac{\sqrt{1-a^2\,x^2}\,\text{ArcCosh}[a\,x]^3}{2\,x^2}-\frac{6\,a^2\,\sqrt{-1+a\,x}\,\text{ArcCosh}[a\,x]\,\text{ArcTan}\left[e^{\text{ArcCosh}[a\,x]}\right]}{\sqrt{1-a\,x}}+$$

$$\frac{a^2\,\sqrt{-1+a\,x}\,\text{ArcCosh}[a\,x]^3\,\text{ArcTan}\left[e^{\text{ArcCosh}[a\,x]}\right]}{\sqrt{1-a\,x}}+\frac{3\,i\,a^2\,\sqrt{-1+a\,x}\,\text{PolyLog}\left[2,-i\,e^{\text{ArcCosh}[a\,x]}\right]}{\sqrt{1-a\,x}}-$$

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

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

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

Result (type 4, 1216 leaves):

$$\frac{1}{128\,x^2\,\sqrt{1-a^2 x^2}}$$

$$(1+a x)\left(-7\,\mathrm{i}\,a^2 \pi^4 x^2 \sqrt{\frac{-1+a x}{1+a x}} + 8\,a^2 \pi^3 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x] + 192\,a x \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^2 - 24\,\mathrm{i}\,a^2 \pi^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^2 -\right.$$

$$64\,\mathrm{ArcCosh}[a x]^3 + 64\,a x\,\mathrm{ArcCosh}[a x]^3 - 32\,a^2 \pi x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^3 +$$

$$16\,\mathrm{i}\,a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^4 + 384\,\mathrm{i}\,a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]\,\mathrm{Log}\left[1-\mathrm{i}\,e^{-\mathrm{ArcCosh}[a x]}\right] +$$

$$8\,a^2 \pi^3 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{Log}\left[1+\mathrm{i}\,e^{-\mathrm{ArcCosh}[a x]}\right] - 384\,\mathrm{i}\,a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]\,\mathrm{Log}\left[1+\mathrm{i}\,e^{-\mathrm{ArcCosh}[a x]}\right] -$$

$$48\,\mathrm{i}\,a^2 \pi^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]\,\mathrm{Log}\left[1+\mathrm{i}\,e^{-\mathrm{ArcCosh}[a x]}\right] - 96\,a^2 \pi x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^2\,\mathrm{Log}\left[1+\mathrm{i}\,e^{-\mathrm{ArcCosh}[a x]}\right] +$$

$$64\,\mathrm{i}\,a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^3\,\mathrm{Log}\left[1+\mathrm{i}\,e^{-\mathrm{ArcCosh}[a x]}\right] + 48\,\mathrm{i}\,a^2 \pi^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]\,\mathrm{Log}\left[1-\mathrm{i}\,e^{\mathrm{ArcCosh}[a x]}\right] +$$

$$96\,a^2 \pi x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^2\,\mathrm{Log}\left[1-\mathrm{i}\,e^{\mathrm{ArcCosh}[a x]}\right] - 8\,a^2 \pi^3 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{Log}\left[1+\mathrm{i}\,e^{\mathrm{ArcCosh}[a x]}\right] -$$

$$64\,\mathrm{i}\,a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^3\,\mathrm{Log}\left[1+\mathrm{i}\,e^{\mathrm{ArcCosh}[a x]}\right] + 8\,a^2 \pi^3 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{Log}\left[\mathrm{Tan}\left[\frac{1}{4}\left(\pi + 2\,\mathrm{i}\,\mathrm{ArcCosh}[a x]\right)\right]\right] +$$

$$48\,\mathrm{i}\,a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\left(8+\pi^2 - 4\,\mathrm{i}\,\pi\,\mathrm{ArcCosh}[a x] - 4\,\mathrm{ArcCosh}[a x]^2\right)\mathrm{PolyLog}\left[2, -\mathrm{i}\,e^{-\mathrm{ArcCosh}[a x]}\right] -$$

$$384\,\mathrm{i}\,a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{PolyLog}\left[2, \mathrm{i}\,e^{-\mathrm{ArcCosh}[a x]}\right] - 192\,\mathrm{i}\,a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]^2\,\mathrm{PolyLog}\left[2, -\mathrm{i}\,e^{\mathrm{ArcCosh}[a x]}\right] +$$

$$48\,\mathrm{i}\,a^2 \pi^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{PolyLog}\left[2, \mathrm{i}\,e^{\mathrm{ArcCosh}[a x]}\right] + 192\,a^2 \pi x^2 \sqrt{\frac{-1+a x}{1+a x}}\,\mathrm{ArcCosh}[a x]\,\mathrm{PolyLog}\left[2, \mathrm{i}\,e^{\mathrm{ArcCosh}[a x]}\right] +$$

$$192\, a^2 \pi x^2 \sqrt{\frac{-1+a x}{1+a x}}\ \text{PolyLog}\left[3, -i\, e^{-\text{ArcCosh}[a x]}\right] - 384\, i\, a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\ \text{ArcCosh}[a x]\ \text{PolyLog}\left[3, -i\, e^{-\text{ArcCosh}[a x]}\right] +$$

$$384\, i\, a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\ \text{ArcCosh}[a x]\ \text{PolyLog}\left[3, -i\, e^{\text{ArcCosh}[a x]}\right] - 192\, a^2 \pi x^2 \sqrt{\frac{-1+a x}{1+a x}}\ \text{PolyLog}\left[3, i\, e^{\text{ArcCosh}[a x]}\right] -$$

$$\left. 384\, i\, a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\ \text{PolyLog}\left[4, -i\, e^{-\text{ArcCosh}[a x]}\right] - 384\, i\, a^2 x^2 \sqrt{\frac{-1+a x}{1+a x}}\ \text{PolyLog}\left[4, -i\, e^{\text{ArcCosh}[a x]}\right]\right)$$

Problem 326: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 30 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 327: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 30 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 333: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 30 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 334: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 106 leaves, 2 steps):

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

Result (type 1, 1 leaves):

???

Problem 339: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 160 leaves, 3 steps):

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

Result (type 1, 1 leaves):

???

Problem 340: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 30 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 341: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(1-c^2 x^2\right)^{5/2}}{x^4 \left(a+b \operatorname{ArcCosh}[c x]\right)^2} \, dx$$

Optimal (type 9, 30 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{\left(1-c^2 x^2\right)^{5/2}}{x^4 \left(a+b \operatorname{ArcCosh}[c x]\right)^2}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 489: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 627 leaves, 27 steps):

$$-\frac{a d x}{e^2}+\frac{b d \sqrt{-1+c x}\,\sqrt{1+c x}}{c e^2}-\frac{2 b \sqrt{-1+c x}\,\sqrt{1+c x}}{9 c^3 e}-\frac{b x^2 \sqrt{-1+c x}\,\sqrt{1+c x}}{9 c e}-$$

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

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

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

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

Result (type 4, 956 leaves):

$$-\frac{a d x}{e^2}+\frac{a x^3}{3 e}+\frac{a d^{3/2} \,\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}{e^{5/2}}+$$

$$\frac{1}{4 e^{5/2}} b \left(\frac{4 d \sqrt{e} \left(\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)-c x \,\text{ArcCosh}[c x]\right)}{c}-\frac{4 e^{3/2} \left(\sqrt{-1+c x}\,\sqrt{1+c x}\,(2+c^2 x^2)-3 c^3 x^3 \,\text{ArcCosh}[c x]\right)}{9 c^3}+\right.$$

$$i\, d^{3/2} \left(\text{ArcCosh}[c x]^2+8 i \,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right] \text{ArcTanh}\left[\frac{(c \sqrt{d}+i \sqrt{e}) \,\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

$$i\,d^{3/2}\Bigg(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+$$

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

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

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

Problem 490: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 521 leaves, 23 steps) :

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

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

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

Result (type 4, 893 leaves):

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

$$c^2 d\left(\text{ArcCosh}[c x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}+i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

$$c^2 d \left(\text{ArcCosh}[c x]^2 + 8 i \,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right] \text{ArcTanh}\left[\frac{\left(c\sqrt{d} - i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{c^2 d + e}}\right] + \right.$$

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

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

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

Problem 491: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 544 leaves, 23 steps):

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

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

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

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

Result (type 4, 893 leaves):

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

$$\frac{1}{4\,e^{3/2}}\,i\,\sqrt{d}\left(\mathrm{ArcCosh}[c\,x]^2+8\,i\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{i\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\mathrm{ArcTanh}\left[\frac{\left(c\,\sqrt{d}+i\,\sqrt{e}\right)\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{4\,e^{3/2}}\,i\,\sqrt{d}\left(\mathrm{ArcCosh}[c\,x]^2+8\,i\,\mathrm{ArcSin}\left[\frac{\sqrt{1-\frac{i\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\mathrm{ArcTanh}\left[\frac{\left(c\,\sqrt{d}-i\,\sqrt{e}\right)\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

Problem 492: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 449 leaves, 18 steps):

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

Result (type 4, 808 leaves):

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

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

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

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

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

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

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

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

Problem 493: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 501 leaves, 18 steps):

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

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

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

Result (type 4, 821 leaves) :

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

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

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

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

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

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

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

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

Problem 494: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 489 leaves, 25 steps) :

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

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

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

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

Result (type 4, 837 leaves) :

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

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

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

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

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

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

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

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

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

Problem 495: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 543 leaves, 23 steps):

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

Result (type 4, 887 leaves):

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

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

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

$$i\,b\sqrt{e}\,x\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

Problem 496: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 550 leaves, 27 steps):

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

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

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

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

Result (type 4, 913 leaves):

$$\frac{1}{4\,d^2\,x^2}\Bigg(-2\,a\,d-4\,a\,e\,x^2\,\text{Log}[x]+2\,a\,e\,x^2\,\text{Log}\left[d+e\,x^2\right]+$$

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

$$e\,x^2\,\Bigg(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\,\text{ArcTanh}\left[\frac{\left(c\,\sqrt{d}+i\,\sqrt{e}\right)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+$$

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

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

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

$$e\,x^2\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

Problem 497: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 624 leaves, 28 steps):

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

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

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

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

Result (type 4, 972 leaves):

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

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

$$3\,i\,e^{3/2}\,x^3\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\,\sqrt{d}+i\,\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

$$3\,i\,e^{3/2}\,x^3\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

Problem 498: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 562 leaves, 24 steps):

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

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

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

Result (type 4, 1108 leaves):

$$\frac{1}{4\,e^2}\Bigg(\frac{2\,a\,d}{d+e\,x^2}+2\,a\,\text{Log}[d+e\,x^2]+$$

$$b\Bigg(\frac{\sqrt{d}\,\text{ArcCosh}[c\,x]}{\sqrt{d}-i\,\sqrt{e}\,x}+\frac{\sqrt{d}\,\text{ArcCosh}[c\,x]}{\sqrt{d}+i\,\sqrt{e}\,x}+2\,\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\Big[\frac{\sqrt{1-\frac{i\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\Big]\,\text{ArcTanh}\Big[\frac{(c\,\sqrt{d}-i\,\sqrt{e})\,\text{Tanh}\big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\big]}{\sqrt{c^2\,d+e}}\Big]+$$

$$8\,i\,\text{ArcSin}\Big[\frac{\sqrt{1+\frac{i\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\Big]\,\text{ArcTanh}\Big[\frac{(c\,\sqrt{d}+i\,\sqrt{e})\,\text{Tanh}\big[\frac{1}{2}\,\text{ArcCosh}[c\,x]\big]}{\sqrt{c^2\,d+e}}\Big]+$$

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

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

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

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

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

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

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

Problem 500: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 598 leaves, 29 steps):

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

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

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

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

Result (type 4, 1146 leaves):

$$\frac{a}{2 d^2 + 2 d e x^2} + \frac{a \operatorname{Log}[x]}{d^2} - \frac{a \operatorname{Log}[d + e x^2]}{2 d^2} +$$

$$\frac{1}{4 d^2} b \left(\frac{\sqrt{d} \operatorname{ArcCosh}[c x]}{\sqrt{d} - i \sqrt{e} x} + \frac{\sqrt{d} \operatorname{ArcCosh}[c x]}{\sqrt{d} + i \sqrt{e} x} - 8 i \operatorname{ArcSin}\left[\frac{\sqrt{1 - \frac{i c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right] \operatorname{ArcTanh}\left[\frac{\left(c \sqrt{d} - i \sqrt{e}\right) \operatorname{Tanh}\left[\frac{1}{2} \operatorname{ArcCosh}[c x]\right]}{\sqrt{c^2 d + e}}\right] -\right.$$

$$8 i \operatorname{ArcSin}\left[\frac{\sqrt{1 + \frac{i c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right] \operatorname{ArcTanh}\left[\frac{\left(c \sqrt{d} + i \sqrt{e}\right) \operatorname{Tanh}\left[\frac{1}{2} \operatorname{ArcCosh}[c x]\right]}{\sqrt{c^2 d + e}}\right] + 4 \operatorname{ArcCosh}[c x] \operatorname{Log}\left[1 + e^{-2 \operatorname{ArcCosh}[c x]}\right] -$$

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

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

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

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

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

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

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

Problem 501: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 634 leaves, 31 steps):

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

Result (type 4, 1237 leaves):

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

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

$$\frac{i\,e\left(-\frac{\text{ArcCosh}[c\,x]}{i\,\sqrt{d}+\sqrt{e}\,x}-\frac{c\,\text{Log}\left[\frac{2\,e\left(-\sqrt{e}-i\,c^2\,\sqrt{d}\,x+\sqrt{-c^2\,d-e}\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)}{c\,\sqrt{-c^2\,d-e}\,\left(i\,\sqrt{d}+\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2\,d-e}}\right)}{4\,d^{5/2}}-$$

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

$$\frac{1}{2\,d^3}\,e\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\,\text{ArcTanh}\left[\frac{\left(c\,\sqrt{d}+i\,\sqrt{e}\right)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{2 d^3} e \left(\text{ArcCosh}[c x]^2 + 8 i \text{ArcSin}\left[\frac{\sqrt{1-\frac{i c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right] \text{ArcTanh}\left[\frac{\left(c \sqrt{d} - i \sqrt{e}\right) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{c^2 d + e}}\right] + \right.$$

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

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

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

Problem 502: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 839 leaves, 49 steps) :

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

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

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

$$\frac{3 b\sqrt{-d} \text{PolyLog}\left[2,\frac{\sqrt{e}\, e^{\text{ArcCosh}[c x]}}{c\sqrt{-d}-\sqrt{-c^2 d-e}}\right]}{4 e^{5/2}}-\frac{3 b\sqrt{-d} \text{PolyLog}\left[2,-\frac{\sqrt{e}\, e^{\text{ArcCosh}[c x]}}{c\sqrt{-d}+\sqrt{-c^2 d-e}}\right]}{4 e^{5/2}}+\frac{3 b\sqrt{-d} \text{PolyLog}\left[2,\frac{\sqrt{e}\, e^{\text{ArcCosh}[c x]}}{c\sqrt{-d}+\sqrt{-c^2 d-e}}\right]}{4 e^{5/2}}$$

Result (type 4, 1185 leaves) :

$$\frac{1}{8 e^{5/2}}\left(8 a\sqrt{e} x+\frac{4 a d\sqrt{e} x}{d+e x^2}-12 a\sqrt{d} \text{ArcTan}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]+b\left(\frac{8\sqrt{e}\left(-\sqrt{\frac{-1+c x}{1+c x}}(1+c x)+c x \text{ArcCosh}[c x]\right)}{c}+\right.\right.$$

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

$$3 i\sqrt{d}\left(\text{ArcCosh}[c x]^2+8 i \text{ArcSin}\left[\frac{\sqrt{1+\frac{i c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right] \text{ArcTanh}\left[\frac{\left(c\sqrt{d}+i\sqrt{e}\right) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

$$3\,i\sqrt{d}\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\Big[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\Big]\,\text{ArcTanh}\Big[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\big[\frac{1}{2}\text{ArcCosh}[c\,x]\big]}{\sqrt{c^2 d+e}}\Big]+\right.$$

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

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

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

Problem 503: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 792 leaves, 46 steps):

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

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

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

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

Result (type 4, 1130 leaves):

$$\frac{1}{8\,e^{3/2}}\left(-\frac{4\,a\sqrt{e}\,x}{d+e\,x^2}+\frac{4\,a\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{d}}+\right.$$

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

$$\frac{1}{\sqrt{d}}\,i\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}+i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{\sqrt{d}}\,i\,\Bigg(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\Big[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\Big]\,\text{ArcTanh}\Big[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\Big]+$$

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

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

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

Problem 504: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 804 leaves, 26 steps):

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

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

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

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

Result (type 4, 1126 leaves) :

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

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

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

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

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

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

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

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

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

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

Problem 505: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 846 leaves, 49 steps) :

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

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

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

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

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

Result (type 4, 1203 leaves):

$$\frac{1}{8\,d^{5/2}}\Bigg(-\frac{8\,a\,\sqrt{d}}{x}-\frac{4\,a\,\sqrt{d}\,e\,x}{d+e\,x^2}-12\,a\,\sqrt{e}\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]+$$

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

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

$$3\,i\sqrt{e}\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}+i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

$$3\,i\sqrt{e}\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

Problem 506: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{x^5 \left(a + b\, \text{ArcCosh}[c\, x]\right)}{\left(d + e\, x^2\right)^3} \, dx$$

Optimal (type 4, 737 leaves, 29 steps):

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

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

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

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

Result (type 4, 1564 leaves):

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

$$b \left(-\frac{7\, i\, \sqrt{d} \left(\frac{\text{ArcCosh}[c\, x]}{-i\, \sqrt{d} + \sqrt{e}\, x} + \frac{c\, \text{Log}\left[\frac{2\, e \left(i\, \sqrt{e} + c^2 \sqrt{d}\, x - i\, \sqrt{-c^2 d - e}\, \sqrt{-1 + c\, x}\, \sqrt{1 + c\, x}\right)}{c\, \sqrt{-c^2 d - e}\, \left(\sqrt{d} + i\, \sqrt{e}\, x\right)}\right]}{\sqrt{-c^2 d - e}}\right)}{16\, e^3} - \frac{7\, i\, \sqrt{d} \left(-\frac{\text{ArcCosh}[c\, x]}{i\, \sqrt{d} + \sqrt{e}\, x} - \frac{c\, \text{Log}\left[\frac{2\, e \left(-\sqrt{e} - i\, c^2 \sqrt{d}\, x + \sqrt{-c^2 d - e}\, \sqrt{-1 + c\, x}\, \sqrt{1 + c\, x}\right)}{c\, \sqrt{-c^2 d - e}\, \left(i\, \sqrt{d} + \sqrt{e}\, x\right)}\right]}{\sqrt{-c^2 d - e}}\right)}{16\, e^3} - \frac{1}{16\, e^{5/2}}$$

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

$$\frac{d\left(\frac{c\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}{\left(c^2\,d+e\right)\left(\mathrm{i}\,\sqrt{d}+\sqrt{e}\,x\right)}-\frac{\mathrm{ArcCosh}[c\,x]}{\sqrt{e}\,\left(\mathrm{i}\,\sqrt{d}+\sqrt{e}\,x\right)^2}-\frac{c^3\,\sqrt{d}\,\left(\mathrm{Log}[4]+\mathrm{Log}\left[\frac{e\,\sqrt{c^2\,d+e}\,\left(-\mathrm{i}\,\sqrt{e}+c^2\,\sqrt{d}\,x+\sqrt{c^2\,d+e}\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)}{c^3\,\left(d-\mathrm{i}\,\sqrt{d}\,\sqrt{e}\,x\right)}\right]\right)}{\sqrt{e}\,\left(c^2\,d+e\right)^{3/2}}\right)}{16\,e^{5/2}}+$$

$$\frac{1}{4\,e^3}\left(\mathrm{ArcCosh}[c\,x]^2+8\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{\mathrm{i}\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\mathrm{ArcTanh}\left[\frac{\left(c\,\sqrt{d}+\mathrm{i}\,\sqrt{e}\right)\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{4\,e^3}\left(\mathrm{ArcCosh}[c\,x]^2+8\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1-\frac{\mathrm{i}\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\mathrm{ArcTanh}\left[\frac{\left(c\,\sqrt{d}-\mathrm{i}\,\sqrt{e}\right)\mathrm{Tanh}\left[\frac{1}{2}\,\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

Problem 509: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 772 leaves, 34 steps):

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

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

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

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

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

Result (type 4, 1613 leaves):

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

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

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

$$\frac{1}{16\,d^2}\sqrt{e}\left(\frac{c\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}{\left(c^2\,d+e\right)\left(\mathrm{i}\sqrt{d}+\sqrt{e}\,x\right)}-\frac{\mathrm{ArcCosh}[c\,x]}{\sqrt{e}\left(\mathrm{i}\sqrt{d}+\sqrt{e}\,x\right)^2}-\frac{c^3\sqrt{d}\left(\mathrm{Log}[4]+\mathrm{Log}\left[\frac{e\sqrt{c^2\,d+e}\left(-\mathrm{i}\sqrt{e}+c^2\sqrt{d}\,x+\sqrt{c^2\,d+e}\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)}{c^3\left(d-\mathrm{i}\sqrt{d}\,\sqrt{e}\,x\right)}\right]\right)}{\sqrt{e}\left(c^2\,d+e\right)^{3/2}}\right)+$$

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

$$\frac{1}{4\,d^3}\left(\mathrm{ArcCosh}[c\,x]^2+8\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{\mathrm{i}\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\mathrm{ArcTanh}\left[\frac{\left(c\sqrt{d}+\mathrm{i}\sqrt{e}\right)\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{4\,d^3}\left(\mathrm{ArcCosh}[c\,x]^2+8\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1-\frac{\mathrm{i}\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\mathrm{ArcTanh}\left[\frac{\left(c\sqrt{d}-\mathrm{i}\sqrt{e}\right)\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

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

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

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

Problem 510: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 834 leaves, 36 steps) :

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

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

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

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

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

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

Result (type 4, 1670 leaves) :

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

$$b\left(\frac{c\,x\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}-\text{ArcCosh}[c\,x]}{2\,d^3\,x^2}+\frac{9\,i\,e\left(\frac{\text{ArcCosh}[c\,x]}{-i\,\sqrt{d}+\sqrt{e}\,x}+\frac{c\,\text{Log}\left[\frac{2\,e\,\left(i\,\sqrt{e}+c^2\,\sqrt{d}\,x-i\,\sqrt{-c^2\,d-e}\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)}{c\,\sqrt{-c^2\,d-e}\,\left(\sqrt{d}+i\,\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2\,d-e}}\right)}{16\,d^{7/2}}+\right.$$

$$\frac{9\,\mathbb{i}\,e\left(-\frac{\text{ArcCosh}[c\,x]}{\mathbb{i}\sqrt{d}+\sqrt{e}\,x}-\frac{c\,\text{Log}\left[\frac{2\,e\left(-\sqrt{e}-\mathbb{i}\,c^2\sqrt{d}\,x+\sqrt{-c^2 d-e}\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)}{c\sqrt{-c^2 d-e}\left(\mathbb{i}\sqrt{d}+\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2 d-e}}\right)}{16\,d^{7/2}}-\frac{1}{16\,d^3}$$

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

$$\frac{1}{16\,d^3}e^{3/2}\left(\frac{c\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}{\left(c^2 d+e\right)\left(\mathbb{i}\sqrt{d}+\sqrt{e}\,x\right)}-\frac{\text{ArcCosh}[c\,x]}{\sqrt{e}\left(\mathbb{i}\sqrt{d}+\sqrt{e}\,x\right)^2}-\frac{c^3\sqrt{d}\left(\text{Log}[4]+\text{Log}\left[\frac{e\sqrt{c^2 d+e}\left(-\mathbb{i}\sqrt{e}+c^2\sqrt{d}\,x+\sqrt{c^2 d+e}\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)}{c^3\left(d-\mathbb{i}\sqrt{d}\,\sqrt{e}\,x\right)}\right]\right)}{\sqrt{e}\left(c^2 d+e\right)^{3/2}}\right)-$$

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

$$\frac{1}{4\,d^4}3\,e\left(\text{ArcCosh}[c\,x]^2+8\,\mathbb{i}\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{\mathbb{i}\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}+\mathbb{i}\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{4\,d^4}3\,e\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

Problem 511: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 1224 leaves, 80 steps):

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

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

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

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

$$\frac{3 b \text{PolyLog}\left[2,-\frac{\sqrt{e} e^{\text{ArcCosh}[c x]}}{c \sqrt{-d}-\sqrt{-c^2 d-e}}\right]}{16 \sqrt{-d} e^{5/2}}+\frac{3 b \text{PolyLog}\left[2,\frac{\sqrt{e} e^{\text{ArcCosh}[c x]}}{c \sqrt{-d}-\sqrt{-c^2 d-e}}\right]}{16 \sqrt{-d} e^{5/2}}-\frac{3 b \text{PolyLog}\left[2,-\frac{\sqrt{e} e^{\text{ArcCosh}[c x]}}{c \sqrt{-d}+\sqrt{-c^2 d-e}}\right]}{16 \sqrt{-d} e^{5/2}}+\frac{3 b \text{PolyLog}\left[2,\frac{\sqrt{e} e^{\text{ArcCosh}[c x]}}{c \sqrt{-d}+\sqrt{-c^2 d-e}}\right]}{16 \sqrt{-d} e^{5/2}}$$

Result (type 4, 1594 leaves) :

$$\frac{a d x}{4 e^2 \left(d+e x^2\right)^2}-\frac{5 a x}{8 e^2 \left(d+e x^2\right)}+\frac{3 a \text{ArcTan}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]}{8 \sqrt{d} e^{5/2}}+$$

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

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

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

$$\frac{1}{32\sqrt{d}\,e^{5/2}}3 i\left(\text{ArcCosh}[c x]^2+8 i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}+i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{32\sqrt{d}\,e^{5/2}}3 i\left(\text{ArcCosh}[c x]^2+8 i\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

Problem 512: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 1234 leaves, 62 steps) :

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

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

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

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

$$\frac{b \,\text{PolyLog}\left[2,-\frac{\sqrt{e}\, e^{\text{ArcCosh}[c x]}}{c \sqrt{-d}-\sqrt{-c^2 d-e}}\right]}{16 (-d)^{3/2} e^{3/2}}-\frac{b \,\text{PolyLog}\left[2,\frac{\sqrt{e}\, e^{\text{ArcCosh}[c x]}}{c \sqrt{-d}-\sqrt{-c^2 d-e}}\right]}{16 (-d)^{3/2} e^{3/2}}+\frac{b \,\text{PolyLog}\left[2,-\frac{\sqrt{e}\, e^{\text{ArcCosh}[c x]}}{c \sqrt{-d}+\sqrt{-c^2 d-e}}\right]}{16 (-d)^{3/2} e^{3/2}}-\frac{b \,\text{PolyLog}\left[2,\frac{\sqrt{e}\, e^{\text{ArcCosh}[c x]}}{c \sqrt{-d}+\sqrt{-c^2 d-e}}\right]}{16 (-d)^{3/2} e^{3/2}}$$

Result (type 4, 1602 leaves):

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

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

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

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

$$\frac{1}{32\,d^{3/2}\,e^{3/2}}\,i\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}+i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{32\,d^{3/2}\,e^{3/2}}\,i\left(\text{ArcCosh}[c\,x]^2+8\,i\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-i\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

Problem 513: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 1234 leaves, 34 steps) :

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

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

$$\frac{3\,b\,c\,\mathrm{ArcTanh}\left[\frac{\sqrt{c\,\sqrt{-d}-\sqrt{e}}\,\sqrt{1+c\,x}}{\sqrt{c\,\sqrt{-d}+\sqrt{e}}\,\sqrt{-1+c\,x}}\right]}{8\,d^2\,\sqrt{c\,\sqrt{-d}-\sqrt{e}}\,\sqrt{c\,\sqrt{-d}+\sqrt{e}}\,\sqrt{e}}+\frac{b\,c^3\,\mathrm{ArcTanh}\left[\frac{\sqrt{c\,\sqrt{-d}+\sqrt{e}}\,\sqrt{1+c\,x}}{\sqrt{c\,\sqrt{-d}-\sqrt{e}}\,\sqrt{-1+c\,x}}\right]}{8\,d\,\left(c\,\sqrt{-d}-\sqrt{e}\right)^{3/2}\,\left(c\,\sqrt{-d}+\sqrt{e}\right)^{3/2}\,\sqrt{e}}-\frac{3\,b\,c\,\mathrm{ArcTanh}\left[\frac{\sqrt{c\,\sqrt{-d}+\sqrt{e}}\,\sqrt{1+c\,x}}{\sqrt{c\,\sqrt{-d}-\sqrt{e}}\,\sqrt{-1+c\,x}}\right]}{8\,d^2\,\sqrt{c\,\sqrt{-d}-\sqrt{e}}\,\sqrt{c\,\sqrt{-d}+\sqrt{e}}\,\sqrt{e}}+$$

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

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

$$\frac{3\,b\,\mathrm{PolyLog}\left[2,\frac{\sqrt{e}\,e^{\mathrm{ArcCosh}[c\,x]}}{c\,\sqrt{-d}-\sqrt{-c^2\,d-e}}\right]}{16\,(-d)^{5/2}\,\sqrt{e}}-\frac{3\,b\,\mathrm{PolyLog}\left[2,-\frac{\sqrt{e}\,e^{\mathrm{ArcCosh}[c\,x]}}{c\,\sqrt{-d}+\sqrt{-c^2\,d-e}}\right]}{16\,(-d)^{5/2}\,\sqrt{e}}+\frac{3\,b\,\mathrm{PolyLog}\left[2,\frac{\sqrt{e}\,e^{\mathrm{ArcCosh}[c\,x]}}{c\,\sqrt{-d}+\sqrt{-c^2\,d-e}}\right]}{16\,(-d)^{5/2}\,\sqrt{e}}$$

Result (type 4, 1593 leaves) :

$$\frac{a\,x}{4\,d\,(d+e\,x^2)^2}+\frac{3\,a\,x}{8\,d^2\,(d+e\,x^2)}+\frac{3\,a\,\mathrm{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{8\,d^{5/2}\,\sqrt{e}}+$$

$$b\left(\frac{3\left(\frac{\mathrm{ArcCosh}[c\,x]}{-i\,\sqrt{d}+\sqrt{e}\,x}+\frac{c\,\mathrm{Log}\left[\frac{2\,e\,\left(i\,\sqrt{e}+c^2\,\sqrt{d}\,x-i\,\sqrt{-c^2\,d-e}\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)}{c\,\sqrt{-c^2\,d-e}\,\left(\sqrt{d}+i\,\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2\,d-e}}\right)}{16\,d^2\,\sqrt{e}}-\frac{3\left(-\frac{\mathrm{ArcCosh}[c\,x]}{i\,\sqrt{d}+\sqrt{e}\,x}-\frac{c\,\mathrm{Log}\left[\frac{2\,e\,\left(-\sqrt{e}-i\,c^2\,\sqrt{d}\,x+\sqrt{-c^2\,d-e}\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)}{c\,\sqrt{-c^2\,d-e}\,\left(i\,\sqrt{d}+\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2\,d-e}}\right)}{16\,d^2\,\sqrt{e}}+\frac{1}{16\,d^{3/2}}\right.$$

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

$$\frac{\mathbb{i}\left(\frac{c\sqrt{-1+c\,x}\;\sqrt{1+c\,x}}{\left(c^2 d+e\right)\left(\mathbb{i}\sqrt{d}+\sqrt{e}\;x\right)}-\frac{\text{ArcCosh}[c\,x]}{\sqrt{e}\;\left(\mathbb{i}\sqrt{d}+\sqrt{e}\;x\right)^2}-\frac{c^3\sqrt{d}\;\left(\text{Log}[4]+\text{Log}\left[\frac{e\sqrt{c^2 d+e}\;\left(-\mathbb{i}\sqrt{e}+c^2\sqrt{d}\;x+\sqrt{c^2 d+e}\;\sqrt{-1+c\,x}\;\sqrt{1+c\,x}\right)}{c^3\left(d-\mathbb{i}\sqrt{d}\;\sqrt{e}\;x\right)}\right]\right)}{\sqrt{e}\;\left(c^2 d+e\right)^{3/2}}\right)}{16\,d^{3/2}}+$$

$$\frac{1}{32\,d^{5/2}\sqrt{e}}\,3\,\mathbb{i}\left(\text{ArcCosh}[c\,x]^2+8\,\mathbb{i}\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{\mathbb{i}\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}+\mathbb{i}\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

$$\frac{1}{32\,d^{5/2}\sqrt{e}}\,3\,\mathbb{i}\left(\text{ArcCosh}[c\,x]^2+8\,\mathbb{i}\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{\mathbb{i}\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\right]\text{ArcTanh}\left[\frac{\left(c\sqrt{d}-\mathbb{i}\sqrt{e}\right)\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]+\right.$$

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

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

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

Problem 519: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 5, 558 leaves, 8 steps):

$$\left(b\,e\left(3\,c^2 d\,e\,(7+m)^2\left(12+7\,m+m^2\right)+3\,c^4 d^2\left(35+12\,m+m^2\right)^2+e^2\left(360+342\,m+119\,m^2+18\,m^3+m^4\right)\right)(f\,x)^{2+m}\left(1-c^2 x^2\right)\right)\Big/$$

$$\left(c^5 f^2 (3+m)^2 (5+m)^2 (7+m)^2\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)+\frac{b\,e^2\left(3\,c^2 d\,(7+m)^2+e\left(30+11\,m+m^2\right)\right)(f\,x)^{4+m}\left(1-c^2 x^2\right)}{c^3 f^4 (5+m)^2 (7+m)^2\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+$$

$$\frac{b\,e^3 (f\,x)^{6+m}\left(1-c^2 x^2\right)}{c\,f^6 (7+m)^2\sqrt{-1+c\,x}\,\sqrt{1+c\,x}}+\frac{d^3 (f\,x)^{1+m}(a+b\,\text{ArcCosh}[c\,x])}{f\,(1+m)}+\frac{3\,d^2 e\,(f\,x)^{3+m}(a+b\,\text{ArcCosh}[c\,x])}{f^3 (3+m)}+$$

$$\frac{3\,d\,e^2 (f\,x)^{5+m}(a+b\,\text{ArcCosh}[c\,x])}{f^5 (5+m)}+\frac{e^3 (f\,x)^{7+m}(a+b\,\text{ArcCosh}[c\,x])}{f^7 (7+m)}-\left(b\left(\frac{c^6 d^3 (3+m)(5+m)(7+m)}{1+m}+\frac{1}{(3+m)(5+m)(7+m)}\right.\right.$$

$$\left.\left.e\,(2+m)\left(3\,c^2 d\,e\,(7+m)^2\left(12+7\,m+m^2\right)+3\,c^4 d^2\left(35+12\,m+m^2\right)^2+e^2\left(360+342\,m+119\,m^2+18\,m^3+m^4\right)\right)\right)(f\,x)^{2+m}\right.$$

$$\left.\sqrt{1-c^2 x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},c^2 x^2\right]\right)\Big/\left(c^5 f^2 (2+m)(3+m)(5+m)(7+m)\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\right)$$

Result (type 6, 3434 leaves) :

$$\frac{a d^3 x (f x)^m}{1+m}+\frac{3 a d^2 e x^3 (f x)^m}{3+m}+\frac{3 a d e^2 x^5 (f x)^m}{5+m}+\frac{a e^3 x^7 (f x)^m}{7+m}+\frac{1}{c} b d^3 (c x)^{-m} (f x)^m$$

$$\left(-\frac{1}{1+m} 12 (c x)^m \left(\left(\sqrt{-1+c x} \sqrt{1+c x} \text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\Big/\left(6 \text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c x,\frac{1}{2} (1-c x)\right]+\right.\right.\right.$$

$$\left.(-1+c x) \left(4 m \text{AppellF1}\left[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]+\text{AppellF1}\left[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\right)-$$

$$\left(\sqrt{\frac{-1+c x}{1+c x}} \text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\Big/\left(6 \text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c x,\frac{1}{2} (1-c x)\right]+(-1+c x)\right.$$

$$\left.\left.\left.\left(4 m \text{AppellF1}\left[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]-\text{AppellF1}\left[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\right)\right)+\frac{(c x)^{1+m} \text{ArcCosh}[c x]}{1+m}\right)+$$

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

$$\left(6 \text{AppellF1}\left[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c x,\frac{1}{2} (1-c x)\right]+\right.$$

$$\left.(-1+c x) \left(4 m \text{AppellF1}\left[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]+\text{AppellF1}\left[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\right)-$$

$$\left(3 \sqrt{\frac{-1+c x}{1+c x}} \text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\Big/\left(6 \text{AppellF1}\left[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c x,\frac{1}{2} (1-c x)\right]+\right.$$

$$\left.(-1+c x) \left(4 m \text{AppellF1}\left[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]-\text{AppellF1}\left[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\right)+$$

$$(-1+c x)^{3/2} \sqrt{1+c x} \left(\left(5 \text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\Big/\left(30 \text{AppellF1}\left[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c x,\frac{1}{2} (1-c x)\right]+\right.\right.$$

$$\left.3 (-1+c x) \left(4 m \text{AppellF1}\left[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c x,\frac{1}{2} (1-c x)\right]+\text{AppellF1}\left[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\right)+$$

$$\left(7 (-1+c x) \text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\Big/\left(70 \text{AppellF1}\left[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c x,\frac{1}{2} (1-c x)\right]+\right.$$

$$\left.\left.\left.5 (-1+c x) \left(4 m \text{AppellF1}\left[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c x,\frac{1}{2} (1-c x)\right]+\text{AppellF1}\left[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c x,\frac{1}{2} (1-c x)\right]\right)\right)\right)\right)+$$

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

$$\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big/\Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$(-1+c\,x)\,\Big(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big)-$$

$$\Bigg(12\,(c\,x)^m\,\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Bigg)\Big/\Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$4\,m\,(-1+c\,x)\,\text{AppellF1}\Big[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]-(-1+c\,x)\,\text{AppellF1}\Big[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)+$$

$$\Big(40\,(c\,x)^m\,(-1+c\,x)^{3/2}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big/\Big(30\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$3\,(-1+c\,x)\,\Big(4\,m\,\text{AppellF1}\Big[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big)+$$

$$\Big(112\,(c\,x)^m\,(-1+c\,x)^{5/2}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big/\Big(70\,\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$5\,(-1+c\,x)\,\Big(4\,m\,\text{AppellF1}\Big[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big)+$$

$$\Big(108\,(c\,x)^m\,(-1+c\,x)^{7/2}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big/$$

$$\Big(7\,\Big(18\,\text{AppellF1}\Big[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+(-1+c\,x)\,\Big(4\,m\,\text{AppellF1}\Big[\frac{9}{2},1-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{9}{2},$$

$$-m,\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big)\Big)+\Big(44\,(c\,x)^m\,(-1+c\,x)^{9/2}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big/$$

$$\Big(9\,\Big(22\,\text{AppellF1}\Big[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+(-1+c\,x)\,\Big(4\,m\,\text{AppellF1}\Big[\frac{11}{2},1-m,-\frac{1}{2},\frac{13}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$\text{AppellF1}\Big[\frac{11}{2},-m,\frac{1}{2},\frac{13}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big)\Big)\Bigg)+\frac{(c\,x)^{5+m}\,\text{ArcCosh}[c\,x]}{5+m}\Bigg)+$$

$$\frac{1}{c}\,b\,e^3\,x^6\,(c\,x)^{-6-m}\,(f\,x)^m\,\Bigg(-\frac{1}{7+m}\,\Bigg(\Big(12\,(c\,x)^m\,\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big/$$

$$\Big(6\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+$$

$$(-1+c\,x)\,\Big(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}\,(1-c\,x)\Big]\Big)\Big)-$$

$$\Bigg(12\ (c\,x)^m \sqrt{\frac{-1+c\,x}{1+c\,x}}\ \text{AppellF1}\Big[\frac{1}{2},\ -m,\ \frac{1}{2},\ \frac{3}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Big/\Bigg(6\ \text{AppellF1}\Big[\frac{1}{2},\ -m,\ \frac{1}{2},\ \frac{3}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+$$

$$4\,m\ (-1+c\,x)\ \text{AppellF1}\Big[\frac{3}{2},\ 1-m,\ \frac{1}{2},\ \frac{5}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]-(-1+c\,x)\ \text{AppellF1}\Big[\frac{3}{2},\ -m,\ \frac{3}{2},\ \frac{5}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)+$$

$$\Bigg(60\ (c\,x)^m\ (-1+c\,x)^{3/2}\ \sqrt{1+c\,x}\ \text{AppellF1}\Big[\frac{3}{2},\ -m,\ -\frac{1}{2},\ \frac{5}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Big/\Bigg(30\ \text{AppellF1}\Big[\frac{3}{2},\ -m,\ -\frac{1}{2},\ \frac{5}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+$$

$$3\ (-1+c\,x)\ \Bigg(4\,m\ \text{AppellF1}\Big[\frac{5}{2},\ 1-m,\ -\frac{1}{2},\ \frac{7}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+\text{AppellF1}\Big[\frac{5}{2},\ -m,\ \frac{1}{2},\ \frac{7}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Bigg)+$$

$$\Bigg(252\ (c\,x)^m\ (-1+c\,x)^{5/2}\ \sqrt{1+c\,x}\ \text{AppellF1}\Big[\frac{5}{2},\ -m,\ -\frac{1}{2},\ \frac{7}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Big/\Bigg(70\ \text{AppellF1}\Big[\frac{5}{2},\ -m,\ -\frac{1}{2},\ \frac{7}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+$$

$$5\ (-1+c\,x)\ \Bigg(4\,m\ \text{AppellF1}\Big[\frac{7}{2},\ 1-m,\ -\frac{1}{2},\ \frac{9}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+\text{AppellF1}\Big[\frac{7}{2},\ -m,\ \frac{1}{2},\ \frac{9}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Bigg)+$$

$$\Bigg(468\ (c\,x)^m\ (-1+c\,x)^{7/2}\ \sqrt{1+c\,x}\ \text{AppellF1}\Big[\frac{7}{2},\ -m,\ -\frac{1}{2},\ \frac{9}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Big/$$

$$\Bigg(7\ \Bigg(18\ \text{AppellF1}\Big[\frac{7}{2},\ -m,\ -\frac{1}{2},\ \frac{9}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+(-1+c\,x)\ \Bigg(4\,m\ \text{AppellF1}\Big[\frac{9}{2},\ 1-m,\ -\frac{1}{2},\ \frac{11}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+$$

$$\text{AppellF1}\Big[\frac{9}{2},\ -m,\ \frac{1}{2},\ \frac{11}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Bigg)\Bigg)+\Bigg(484\ (c\,x)^m\ (-1+c\,x)^{9/2}\ \sqrt{1+c\,x}$$

$$\text{AppellF1}\Big[\frac{9}{2},\ -m,\ -\frac{1}{2},\ \frac{11}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Big/\Bigg(9\ \Bigg(22\ \text{AppellF1}\Big[\frac{9}{2},\ -m,\ -\frac{1}{2},\ \frac{11}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+$$

$$(-1+c\,x)\ \Bigg(4\,m\ \text{AppellF1}\Big[\frac{11}{2},\ 1-m,\ -\frac{1}{2},\ \frac{13}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+\text{AppellF1}\Big[\frac{11}{2},\ -m,\ \frac{1}{2},\ \frac{13}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(260\ (c\,x)^m\ (-1+c\,x)^{11/2}\ \sqrt{1+c\,x}\ \text{AppellF1}\Big[\frac{11}{2},\ -m,\ -\frac{1}{2},\ \frac{13}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Big/$$

$$\Bigg(11\ \Bigg(26\ \text{AppellF1}\Big[\frac{11}{2},\ -m,\ -\frac{1}{2},\ \frac{13}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+$$

$$(-1+c\,x)\ \Bigg(4\,m\ \text{AppellF1}\Big[\frac{13}{2},\ 1-m,\ -\frac{1}{2},\ \frac{15}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+\text{AppellF1}\Big[\frac{13}{2},\ -m,\ \frac{1}{2},\ \frac{15}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(60\ (c\,x)^m\ (-1+c\,x)^{13/2}\ \sqrt{1+c\,x}\ \text{AppellF1}\Big[\frac{13}{2},\ -m,\ -\frac{1}{2},\ \frac{15}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Big/$$

$$\Bigg(13\ \Bigg(30\ \text{AppellF1}\Big[\frac{13}{2},\ -m,\ -\frac{1}{2},\ \frac{15}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+(-1+c\,x)\ \Bigg(4\,m\ \text{AppellF1}\Big[\frac{15}{2},\ 1-m,\ -\frac{1}{2},\ \frac{17}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]+$$

$$\text{AppellF1}\Big[\frac{15}{2},\ -m,\ \frac{1}{2},\ \frac{17}{2},\ 1-c\,x,\ \frac{1}{2}\ (1-c\,x)\Big]\Bigg)\Bigg)\Bigg)\Bigg)+\frac{(c\,x)^{7+m}\ \text{ArcCosh}[c\,x]}{7+m}\Bigg)$$

Problem 520: Result unnecessarily involves higher level functions and more than twice size of optimal

antiderivative.

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

Optimal (type 5, 353 leaves, 7 steps):

$$\frac{b e \left(2 c^2 d (5+m)^2+e \left(12+7 m+m^2\right)\right) (f x)^{2+m} \left(1-c^2 x^2\right)}{c^3 f^2 (3+m)^2 (5+m)^2 \sqrt{-1+c x} \sqrt{1+c x}}+\frac{b e^2 (f x)^{4+m} \left(1-c^2 x^2\right)}{c f^4 (5+m)^2 \sqrt{-1+c x} \sqrt{1+c x}}+$$
$$\frac{d^2 (f x)^{1+m} (a+b \text{ArcCosh}[c x])}{f (1+m)}+\frac{2 d e (f x)^{3+m} (a+b \text{ArcCosh}[c x])}{f^3 (3+m)}+\frac{e^2 (f x)^{5+m} (a+b \text{ArcCosh}[c x])}{f^5 (5+m)}-$$
$$\left(b \left(\frac{c^4 d^2 (3+m) (5+m)}{1+m}+\frac{e (2+m) \left(2 c^2 d (5+m)^2+e \left(12+7 m+m^2\right)\right)}{(3+m) (5+m)}\right) (f x)^{2+m} \sqrt{1-c^2 x^2} \text{ Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, c^2 x^2\right]\right) \Big/$$
$$\left(c^3 f^2 (2+m) (3+m) (5+m) \sqrt{-1+c x} \sqrt{1+c x}\right)$$

Result (type 6, 2079 leaves):

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

$$\Bigg(3\sqrt{\frac{-1+c\,x}{1+c\,x}}\ \text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Big/\Bigg(6\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+$$

$$(-1+c\,x)\Bigg(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]-\text{AppellF1}\Big[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg)+$$

$$(-1+c\,x)^{3/2}\sqrt{1+c\,x}\ \Bigg(\Bigg(5\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Big/\Bigg(30\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+$$

$$3(-1+c\,x)\Bigg(4\,m\,\text{AppellF1}\Big[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg)+$$

$$\Bigg(7(-1+c\,x)\,\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Big/\Bigg(70\,\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+$$

$$5(-1+c\,x)\Bigg(4\,m\,\text{AppellF1}\Big[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg)\Bigg)\Bigg)+$$

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

$$\Bigg(6\,\text{AppellF1}\Big[\frac{1}{2},-m,-\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+$$

$$(-1+c\,x)\Bigg(4\,m\,\text{AppellF1}\Big[\frac{3}{2},1-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg)-$$

$$\Bigg(12(c\,x)^m\sqrt{\frac{-1+c\,x}{1+c\,x}}\ \text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Big/\Bigg(6\,\text{AppellF1}\Big[\frac{1}{2},-m,\frac{1}{2},\frac{3}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+$$

$$4\,m(-1+c\,x)\,\text{AppellF1}\Big[\frac{3}{2},1-m,\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]-(-1+c\,x)\,\text{AppellF1}\Big[\frac{3}{2},-m,\frac{3}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)+$$

$$\Bigg(40(c\,x)^m(-1+c\,x)^{3/2}\sqrt{1+c\,x}\ \text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Big/\Bigg(30\,\text{AppellF1}\Big[\frac{3}{2},-m,-\frac{1}{2},\frac{5}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+$$

$$3(-1+c\,x)\Bigg(4\,m\,\text{AppellF1}\Big[\frac{5}{2},1-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{5}{2},-m,\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg)+$$

$$\Bigg(112(c\,x)^m(-1+c\,x)^{5/2}\sqrt{1+c\,x}\ \text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Big/\Bigg(70\,\text{AppellF1}\Big[\frac{5}{2},-m,-\frac{1}{2},\frac{7}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+$$

$$5(-1+c\,x)\Bigg(4\,m\,\text{AppellF1}\Big[\frac{7}{2},1-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{7}{2},-m,\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg)+$$

$$\Bigg(108(c\,x)^m(-1+c\,x)^{7/2}\sqrt{1+c\,x}\ \text{AppellF1}\Big[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]\Bigg)\Big/$$

$$\Bigg(7\Bigg(18\,\text{AppellF1}\Big[\frac{7}{2},-m,-\frac{1}{2},\frac{9}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+(-1+c\,x)\Bigg(4\,m\,\text{AppellF1}\Big[\frac{9}{2},1-m,-\frac{1}{2},\frac{11}{2},1-c\,x,\frac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\frac{9}{2},$$

$$-m,\frac{1}{2},\frac{11}{2},1-c x,\frac{1}{2}(1-c x)\Big]\Big)\Big)\Big)+\left(44(c x)^m(-1+c x)^{9/2}\sqrt{1+c x}\,\text{AppellF1}\left[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c x,\frac{1}{2}(1-c x)\right]\right)\Big/$$

$$\left(9\left(22\,\text{AppellF1}\left[\frac{9}{2},-m,-\frac{1}{2},\frac{11}{2},1-c x,\frac{1}{2}(1-c x)\right]+(-1+c x)\left(4 m\,\text{AppellF1}\left[\frac{11}{2},1-m,-\frac{1}{2},\frac{13}{2},1-c x,\frac{1}{2}(1-c x)\right]+\right.\right.\right.$$

$$\left.\left.\left.\text{AppellF1}\left[\frac{11}{2},-m,\frac{1}{2},\frac{13}{2},1-c x,\frac{1}{2}(1-c x)\right]\right)\right)\right)+\frac{(c x)^{5+m}\,\text{ArcCosh}[c x]}{5+m}\Bigg)$$

Problem 521: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 5, 198 leaves, 5 steps):

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

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

Result (type 6, 1044 leaves):

$$
\begin{aligned}
&\frac{a\,d\,x\,(f\,x)^m}{1+m}+\frac{a\,e\,x^3\,(f\,x)^m}{3+m}+\frac{1}{c}b\,d\,(c\,x)^{-m}\,(f\,x)^m\\
&\quad\Bigg(-\frac{1}{1+m}12\,(c\,x)^m\Bigg(\Bigg(\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\tfrac{1}{2},-m,-\tfrac{1}{2},\tfrac{3}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg/\Bigg(6\,\text{AppellF1}\Big[\tfrac{1}{2},-m,-\tfrac{1}{2},\tfrac{3}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\\
&\qquad(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\tfrac{3}{2},1-m,-\tfrac{1}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\tfrac{3}{2},-m,\tfrac{1}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Big)\Bigg)-\\
&\qquad\Bigg(\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\Big[\tfrac{1}{2},-m,\tfrac{1}{2},\tfrac{3}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg/\Bigg(6\,\text{AppellF1}\Big[\tfrac{1}{2},-m,\tfrac{1}{2},\tfrac{3}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+(-1+c\,x)\\
&\qquad\Big(4\,m\,\text{AppellF1}\Big[\tfrac{3}{2},1-m,\tfrac{1}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]-\text{AppellF1}\Big[\tfrac{3}{2},-m,\tfrac{3}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Big)\Bigg)\Bigg)+\frac{(c\,x)^{1+m}\,\text{ArcCosh}[c\,x]}{1+m}\Bigg)+\\
&\frac{1}{c}b\,e\,x^2\,(c\,x)^{-2-m}\,(f\,x)^m\Bigg(-\frac{1}{3+m}4\,(c\,x)^m\Bigg(\Bigg(3\sqrt{-1+c\,x}\,\sqrt{1+c\,x}\,\text{AppellF1}\Big[\tfrac{1}{2},-m,-\tfrac{1}{2},\tfrac{3}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg/\\
&\qquad\Bigg(6\,\text{AppellF1}\Big[\tfrac{1}{2},-m,-\tfrac{1}{2},\tfrac{3}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\\
&\qquad(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\tfrac{3}{2},1-m,-\tfrac{1}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\tfrac{3}{2},-m,\tfrac{1}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Big)\Bigg)-\\
&\qquad\Bigg(3\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\Big[\tfrac{1}{2},-m,\tfrac{1}{2},\tfrac{3}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg/\Bigg(6\,\text{AppellF1}\Big[\tfrac{1}{2},-m,\tfrac{1}{2},\tfrac{3}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\\
&\qquad(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\tfrac{3}{2},1-m,\tfrac{1}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]-\text{AppellF1}\Big[\tfrac{3}{2},-m,\tfrac{3}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Big)\Bigg)+\\
&\qquad(-1+c\,x)^{3/2}\sqrt{1+c\,x}\,\Bigg(\Bigg(5\,\text{AppellF1}\Big[\tfrac{3}{2},-m,-\tfrac{1}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg/\Bigg(30\,\text{AppellF1}\Big[\tfrac{3}{2},-m,-\tfrac{1}{2},\tfrac{5}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\\
&\qquad\quad 3\,(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\tfrac{5}{2},1-m,-\tfrac{1}{2},\tfrac{7}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\text{AppellF1}\Big[\tfrac{5}{2},-m,\tfrac{1}{2},\tfrac{7}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Big)\Bigg)+\\
&\qquad\Bigg(7\,(-1+c\,x)\,\text{AppellF1}\Big[\tfrac{5}{2},-m,-\tfrac{1}{2},\tfrac{7}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Bigg)\Bigg/\Bigg(70\,\text{AppellF1}\Big[\tfrac{5}{2},-m,-\tfrac{1}{2},\tfrac{7}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\\
&\qquad\quad 5\,(-1+c\,x)\Big(4\,m\,\text{AppellF1}\Big[\tfrac{7}{2},1-m,-\tfrac{1}{2},\tfrac{9}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]+\\
&\qquad\qquad\text{AppellF1}\Big[\tfrac{7}{2},-m,\tfrac{1}{2},\tfrac{9}{2},1-c\,x,\tfrac{1}{2}(1-c\,x)\Big]\Big)\Bigg)\Bigg)\Bigg)+\frac{(c\,x)^{3+m}\,\text{ArcCosh}[c\,x]}{3+m}\Bigg)
\end{aligned}
$$

Problem 529: Unable to integrate problem.

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

Optimal (type 4, 763 leaves, 22 steps):

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

Result (type 8, 22 leaves):

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

Problem 546: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 22 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 547: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 22 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 550: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 24 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 551: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 24 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{\left(d+e x^2\right)^{5/2} (a+b \operatorname{ArcCosh}[c x])^2}, x\right]$$

Result (type 1, 1 leaves):

???

Test results for the 296 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):

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

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) :

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

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) :

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

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

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

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

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

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

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

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

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):

$$-\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\,\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]+\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]+\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[\frac{(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)}{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]-\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[\frac{(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)}{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]+i\left(\text{PolyLog}\left[2,\frac{\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)}{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]-\text{PolyLog}\left[2,\frac{\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)}{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 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) :

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

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

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

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

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

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

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

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

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

Problem 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):

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

Problem 20: Result unnecessarily involves imaginary or complex numbers.

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

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

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

Result (type 3, 259 leaves):

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

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):

$$\frac{1}{3 e}\left(3 a^2 \text{Log}[d+e x]+\right.$$

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

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

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

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

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

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

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

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

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

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

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

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):

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

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

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

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

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

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

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

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

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

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

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):

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

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

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

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

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

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

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

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

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

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

Problem 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 9, 20 leaves, 0 steps):

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

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):

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

Result (type 6, 715 leaves):

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

$$\left(e\,(1+m)\,\left(-6\,(c\,d+e)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}\,(1-c\,x),-\frac{e\,(-1+c\,x)}{c\,d+e}\right]-4\,e\,m\,(-1+c\,x)\right.\right.$$

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

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

$$\left(6\,(c\,d+e)\,\text{AppellF1}\left[\frac{1}{2},-\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}-\frac{c\,x}{2},\frac{e-c\,e\,x}{c\,d+e}\right]+4\,e\,m\,(-1+c\,x)\,\text{AppellF1}\left[\frac{3}{2},-\frac{1}{2},1-m,\frac{5}{2},\frac{1}{2}-\frac{c\,x}{2},\frac{e-c\,e\,x}{c\,d+e}\right]+\right.$$

$$\left.(c\,d+e)\,(-1+c\,x)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},-m,\frac{5}{2},\frac{1}{2}-\frac{c\,x}{2},\frac{e-c\,e\,x}{c\,d+e}\right]\right)+\left(\sqrt{\frac{-1+c\,x}{1+c\,x}}\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}-\frac{c\,x}{2},\frac{e-c\,e\,x}{c\,d+e}\right]\right)\Big/$$

$$\left(-6\,(c\,d+e)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2},-m,\frac{3}{2},\frac{1}{2}-\frac{c\,x}{2},\frac{e-c\,e\,x}{c\,d+e}\right]-4\,e\,m\,(-1+c\,x)\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2},1-m,\frac{5}{2},\frac{1}{2}-\frac{c\,x}{2},\frac{e-c\,e\,x}{c\,d+e}\right]+\right.$$

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

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):

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

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

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

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

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

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

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

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

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) :

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

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

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

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

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

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

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

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

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

Problem 56: Result unnecessarily involves imaginary or complex numbers.

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

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):

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

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

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

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

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

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

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

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

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

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

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

Problem 57: Result unnecessarily involves imaginary or complex numbers.

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

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

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

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

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

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

Result (type 4, 1154 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 4, 3068 leaves) :

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

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

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

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

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

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

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

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

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

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

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

$$\frac{1}{72\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)} b d \sqrt{-d(-1+c x)(1+c x)} \left(-\frac{1}{\sqrt{-c^2 f^2+g^2}} 9 \left(-2 \text{ArcCosh}[c x] \text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right] + \right.\right.$$

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

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

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

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

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

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

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

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

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

$$9\,c\,f\,g^2\,\text{Cosh}[2\,\text{ArcCosh}[c\,x]] + 2\,g^3\,\text{Cosh}[3\,\text{ArcCosh}[c\,x]] + \frac{1}{\sqrt{-c^2 f^2 + g^2}}\,9\,\left(8\,c^4 f^4 - 8\,c^2 f^2 g^2 + g^4\right)$$

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 4, 1744 leaves, 39 steps):

$$\frac{2 b c d^2 x \sqrt{d - c^2 d x^2}}{15 g \sqrt{-1 + c x} \sqrt{1 + c x}} + \frac{b c d^2 \left(c^2 f^2 - 2 g^2\right) x \sqrt{d - c^2 d x^2}}{3 g^3 \sqrt{-1 + c x} \sqrt{1 + c x}} - \frac{b c d^2 \left(c^2 f^2 - g^2\right)^2 x \sqrt{d - c^2 d x^2}}{g^5 \sqrt{-1 + c x} \sqrt{1 + c x}} - \frac{b c^3 d^2 f x^2 \sqrt{d - c^2 d x^2}}{16 g^2 \sqrt{-1 + c x} \sqrt{1 + c x}} +$$

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

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

$$\frac{c^2 d^2 f x \sqrt{d - c^2 d x^2} \left(a + b \,\text{ArcCosh}[c x]\right)}{8 g^2} - \frac{c^2 d^2 f \left(c^2 f^2 - 2 g^2\right) x \sqrt{d - c^2 d x^2} \left(a + b \,\text{ArcCosh}[c x]\right)}{2 g^4} -$$

$$\frac{c^4 d^2 f x^3 \sqrt{d - c^2 d x^2} \left(a + b \,\text{ArcCosh}[c x]\right)}{4 g^2} - \frac{2 d^2 (1 - c x) (1 + c x) \sqrt{d - c^2 d x^2} \left(a + b \,\text{ArcCosh}[c x]\right)}{15 g} -$$

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

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

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

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

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

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

Result (type 4, 7300 leaves):

$$\sqrt{-d\left(-1+c^2x^2\right)}\left(\frac{a d^2\left(15c^4f^4-35c^2f^2g^2+23g^4\right)}{15g^5}-\frac{a c^2d^2f\left(4c^2f^2-9g^2\right)x}{8g^4}-\frac{a c^2d^2\left(-5c^2f^2+11g^2\right)x^2}{15g^3}-\frac{a c^4d^2f x^3}{4g^2}+\frac{a c^4d^2x^4}{5g}\right)-$$

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

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

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

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

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

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

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

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

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

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

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

$$\frac{1}{36 \sqrt{\frac{-1+c x}{1+c x}} (1 + c x)} b d^2 \sqrt{-d (-1 + c x) (1 + c x)} \left(-\frac{1}{\sqrt{-c^2 f^2 + g^2}} 9 \left(-2 \text{ArcCosh}[c x] \text{ArcTan}\left[\frac{(c f + g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2 + g^2}}\right] +\right.\right.$$

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

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

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

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

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

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

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

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

$$9 c f g^2 \text{Cosh}[2 \text{ArcCosh}[c x]]+2 g^3 \text{Cosh}[3 \text{ArcCosh}[c x]]+\frac{1}{\sqrt{-c^2 f^2+g^2}} 9 \left(8 c^4 f^4-8 c^2 f^2 g^2+g^4\right)$$

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

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

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

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

$$\left.\text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right) \text{Log}\left[\frac{(c f+g) \left(c f-g+i \sqrt{-c^2 f^2+g^2}\right) \left(-1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]-\Bigg(\text{ArcCos}\Bigg[$$

$$\left.-\frac{c f}{g}\right]-2 \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\Bigg) \text{Log}\left[\frac{(c f+g) \left(-c f+g+i \sqrt{-c^2 f^2+g^2}\right) \left(1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]+$$

$$i \left(\text{PolyLog}\left[2, \frac{\left(c f-i \sqrt{-c^2 f^2+g^2}\right) \left(c f+g-i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]-\text{PolyLog}\right[2,$$

$$\frac{\left(c\,f+i\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-i\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}\Bigg]\Bigg)\Bigg)+$$

$$18\,c\,f\,g^2\,\text{ArcCosh}[c\,x]\,\text{Sinh}[2\,\text{ArcCosh}[c\,x]]-6\,g^3\,\text{ArcCosh}[c\,x]\,\text{Sinh}[3\,\text{ArcCosh}[c\,x]]\Bigg)\Bigg)-$$

$$b\,d^2\Bigg(\frac{1}{32\,g^2\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}\sqrt{-d\,(-1+c\,x)\,(1+c\,x)}\left(-2\,c\,g\,x+2\,g\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\text{ArcCosh}[c\,x]-c\,f\,\text{ArcCosh}[c\,x]^2+\right.$$

$$\frac{1}{\sqrt{-c^2 f^2+g^2}}\left(-2\,c^2 f^2+g^2\right)\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-\right.$$

$$2\,i\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\right.$$

$$\left.\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c\,x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,f+c\,g\,x}}\right]-\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\frac{(c\,f+g)\left(c\,f-g+i\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\ \text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}\right]-\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\right.$$

$$\mathrm{ArcTan}\left[\frac{(-c f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\Bigg)\,\mathrm{Log}\left[\frac{(c f+g)\left(-c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]\right)}{g\left(c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]\right)}\right]+$$

$$\mathrm{i}\left(\mathrm{PolyLog}\left[2,\frac{\left(c f-\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]\right)}{g\left(c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]\right)}\right]-\mathrm{PolyLog}\left[2,\right.\right.$$

$$\left.\left.\frac{\left(c f+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]\right)}{g\left(c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]\right)}\right]\right)\Bigg)\Bigg)+$$

$$\frac{1}{16\sqrt{-c^2 f^2+g^2}\,\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)}\sqrt{-d\,(-1+c x)\,(1+c x)}\left(-2\,\mathrm{ArcCosh}[c x]\,\mathrm{ArcTan}\left[\frac{(c f+g)\,\mathrm{Coth}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\right.$$

$$2\,\mathrm{i}\,\mathrm{ArcCos}\left[-\frac{c f}{g}\right]\mathrm{ArcTan}\left[\frac{(-c f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-$$

$$\left(\mathrm{ArcCos}\left[-\frac{c f}{g}\right]+2\left(\mathrm{ArcTan}\left[\frac{(c f+g)\,\mathrm{Coth}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\mathrm{ArcTan}\left[\frac{(-c f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)$$

$$\mathrm{Log}\left[\frac{e^{-\frac{1}{2}\mathrm{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c f+c g x}}\right]-$$

$$\left(\mathrm{ArcCos}\left[-\frac{c f}{g}\right]-2\left(\mathrm{ArcTan}\left[\frac{(c f+g)\,\mathrm{Coth}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\mathrm{ArcTan}\left[\frac{(-c f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)$$

$$\mathrm{Log}\left[\frac{e^{\frac{1}{2}\mathrm{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c f+c g x}}\right]+\left(\mathrm{ArcCos}\left[-\frac{c f}{g}\right]+2\,\mathrm{ArcTan}\left[\frac{(-c f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\mathrm{Log}\left[\frac{(c f+g)\left(c f-g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\right)\left(-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]\right)}{g\left(c f+g+\mathrm{i}\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c x]\right]\right)}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2 \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right) \text{Log}\left[\frac{(c f+g) \left(-c f+g+\mathrm{i} \sqrt{-c^2 f^2+g^2}\right) \left(1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+\mathrm{i} \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]-$$

$$\mathrm{i} \left(\text{PolyLog}\left[2, \frac{\left(c f-\mathrm{i} \sqrt{-c^2 f^2+g^2}\right) \left(c f+g-\mathrm{i} \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+\mathrm{i} \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]-\right.$$

$$\left.\left.\text{PolyLog}\left[2, \frac{\left(c f+\mathrm{i} \sqrt{-c^2 f^2+g^2}\right) \left(c f+g-\mathrm{i} \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+\mathrm{i} \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]\right)\right)+$$

$$\frac{1}{144 g^4 \sqrt{\frac{-1+c x}{1+c x}} (1+c x)} \sqrt{-d (-1+c x) (1+c x)} \left(-18 c g \left(-4 c^2 f^2+g^2\right) x+18 g \left(-4 c^2 f^2+g^2\right) \sqrt{\frac{-1+c x}{1+c x}} (1+c x) \text{ArcCosh}[c x]+\right.$$

$$18 c f \left(2 c^2 f^2-g^2\right) \text{ArcCosh}[c x]^2-9 c f g^2 \text{Cosh}[2 \text{ArcCosh}[c x]]+2 g^3 \text{Cosh}[3 \text{ArcCosh}[c x]]+$$

$$\frac{1}{\sqrt{-c^2 f^2+g^2}} 9 \left(8 c^4 f^4-8 c^2 f^2 g^2+g^4\right) \left(2 \text{ArcCosh}[c x] \text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-\right.$$

$$2 \mathrm{i} \text{ArcCos}\left[-\frac{c f}{g}\right] \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\right.$$

$$\left.\left(\text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right) \text{Log}\left[\frac{e^{-\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2 \left(\text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{e^{\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]-\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2 \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\mathrm{Log}\Big[\frac{(c\,f+g)\left(c\,f-g+i\sqrt{-c^2 f^2+g^2}\right)\left(-1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}\Big]-\Big(\mathrm{ArcCos}\Big[-\frac{c\,f}{g}\Big]-2$$

$$\mathrm{ArcTan}\Big[\frac{(-c\,f+g)\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\Big]\Big)\,\mathrm{Log}\Big[\frac{(c\,f+g)\left(-c\,f+g+i\sqrt{-c^2 f^2+g^2}\right)\left(1+\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}\Big]+$$

$$i\,\Big(\mathrm{PolyLog}\Big[2,\frac{\left(c\,f-i\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-i\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}\Big]-\mathrm{PolyLog}\Big[2,$$

$$\frac{\left(c\,f+i\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-i\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\sqrt{-c^2 f^2+g^2}\,\mathrm{Tanh}\left[\frac{1}{2}\mathrm{ArcCosh}[c\,x]\right]\right)}\Big]\Big)\Big)+$$

$$18\,c\,f\,g^2\,\mathrm{ArcCosh}[c\,x]\,\mathrm{Sinh}[2\,\mathrm{ArcCosh}[c\,x]]-6\,g^3\,\mathrm{ArcCosh}[c\,x]\,\mathrm{Sinh}[3\,\mathrm{ArcCosh}[c\,x]]\Big)-\frac{1}{32\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)}$$

$$\sqrt{-d\,(-1+c\,x)\,(1+c\,x)}\,\Big(-\frac{2\,c\left(16\,c^4 f^4-12\,c^2 f^2 g^2+g^4\right)x}{g^5}+\frac{32\,c^4 f^4\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\mathrm{ArcCosh}[c\,x]}{g^5}-$$

$$\frac{24\,c^2 f^2\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\mathrm{ArcCosh}[c\,x]}{g^3}+\frac{2\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\mathrm{ArcCosh}[c\,x]}{g}-\frac{16\,c^5 f^5\,\mathrm{ArcCosh}[c\,x]^2}{g^6}+$$

$$\frac{16\,c^3 f^3\,\mathrm{ArcCosh}[c\,x]^2}{g^4}-\frac{3\,c\,f\,\mathrm{ArcCosh}[c\,x]^2}{g^2}-\frac{2\,c\,f\left(-2\,c^2 f^2+g^2\right)\mathrm{Cosh}[2\,\mathrm{ArcCosh}[c\,x]]}{g^4}-$$

$$\frac{8\,c^2 f^2\,\mathrm{Cosh}[3\,\mathrm{ArcCosh}[c\,x]]}{9\,g^3}+\frac{2\,\mathrm{Cosh}[3\,\mathrm{ArcCosh}[c\,x]]}{9\,g}+\frac{c\,f\,\mathrm{Cosh}[4\,\mathrm{ArcCosh}[c\,x]]}{4\,g^2}-\frac{2\,\mathrm{Cosh}[5\,\mathrm{ArcCosh}[c\,x]]}{25\,g}+$$

$$\frac{1}{g^6 \sqrt{-c^2 f^2+g^2}} \left(-2 c^2 f^2+g^2\right) \left(16 c^4 f^4-16 c^2 f^2 g^2+g^4\right) \left(2 \text{ArcCosh}[c x] \text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-\right.$$

$$2 i \text{ArcCos}\left[-\frac{c f}{g}\right] \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\right.$$

$$\left.\left(\text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right) \text{Log}\left[\frac{e^{-\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2 \left(\text{ArcTan}\left[\frac{(c f+g) \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{e^{\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]-\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2 \text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[\frac{(c f+g) \left(c f-g+i \sqrt{-c^2 f^2+g^2}\right) \left(-1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]-\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\right.$$

$$\left.\text{ArcTan}\left[\frac{(-c f+g) \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right) \text{Log}\left[\frac{(c f+g) \left(-c f+g+i \sqrt{-c^2 f^2+g^2}\right) \left(1+\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]+$$

$$i \left(\text{PolyLog}\left[2, \frac{\left(c f-i \sqrt{-c^2 f^2+g^2}\right) \left(c f+g-i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]-\text{PolyLog}\left[2,\right.\right.$$

$$\left.\left.\left.\frac{\left(c f+i \sqrt{-c^2 f^2+g^2}\right) \left(c f+g-i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g \left(c f+g+i \sqrt{-c^2 f^2+g^2} \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]\right)\right)-\frac{8 c^3 f^3 \text{ArcCosh}[c x] \text{Sinh}[2 \text{ArcCosh}[c x]]}{g^4}+$$

$$\frac{4 c f \text{ArcCosh}[c x] \text{Sinh}[2 \text{ArcCosh}[c x]]}{g^2}+\frac{8 c^2 f^2 \text{ArcCosh}[c x] \text{Sinh}[3 \text{ArcCosh}[c x]]}{3 g^3}-\frac{2 \text{ArcCosh}[c x] \text{Sinh}[3 \text{ArcCosh}[c x]]}{3 g}-$$

$$\left.\left.\frac{c\,f\,\text{ArcCosh}[c\,x]\,\text{Sinh}[4\,\text{ArcCosh}[c\,x]]}{g^2}+\frac{2\,\text{ArcCosh}[c\,x]\,\text{Sinh}[5\,\text{ArcCosh}[c\,x]]}{5\,g}\right)\right)$$

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):

$$\frac{1}{\sqrt{-c^2 f^2+g^2}}\left(\frac{a\,\text{Log}[f+g\,x]}{\sqrt{d}}-\frac{a\,\text{Log}\left[d\left(g+c^2 f\,x\right)+\sqrt{d}\,\sqrt{-c^2 f^2+g^2}\,\sqrt{d-c^2 d\,x^2}\right]}{\sqrt{d}}\right.-\frac{1}{\sqrt{d-c^2 d\,x^2}}$$

$$b\,\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-2\,i\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\right.$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c\,x]}\,\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,(f+g\,x)}}\right]+\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-\right.$$

$$\left.2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c\,x]}\,\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,(f+g\,x)}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\text{Log}\left[\frac{(c\,f+g)\left(c\,f-g+i\,\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\,\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\text{Log}\left[\frac{(c\,f+g)\left(-c\,f+g+i\,\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\,\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(c\,f-i\,\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-i\,\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\,\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}\right]-\right.$$

$$\left.\left.\left.\text{PolyLog}\left[2,\frac{\left(c\,f+i\,\sqrt{-c^2 f^2+g^2}\right)\left(c\,f+g-i\,\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}{g\left(c\,f+g+i\,\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c\,x]\right]\right)}\right]\right)\right)\right)$$

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):

$$-\frac{a\,g\sqrt{d-c^2\,d\,x^2}}{d\,(-c^2\,f^2+g^2)\,(f+g\,x)}-\frac{a\,c^2\,f\,\text{Log}[f+g\,x]}{\sqrt{d}\,(-c^2\,f^2+g^2)^{3/2}}-\frac{a\,c^2\,f\,\text{Log}\left[d\,(g+c^2\,f\,x)+\sqrt{d}\,\sqrt{-c^2\,f^2+g^2}\,\sqrt{d-c^2\,d\,x^2}\right]}{\sqrt{d}\,(c\,f-g)\,(c\,f+g)\,\sqrt{-c^2\,f^2+g^2}}+$$

$$\frac{1}{\sqrt{d-c^2\,d\,x^2}}\,b\,c\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\left(-\frac{g\sqrt{\frac{-1+c\,x}{1+c\,x}}\,(1+c\,x)\,\text{ArcCosh}[c\,x]}{(c\,f-g)\,(c\,f+g)\,(c\,f+c\,g\,x)}+\frac{\text{Log}\left[1+\frac{g\,x}{f}\right]}{c^2\,f^2-g^2}+\right.$$

$$\frac{1}{(-c^2\,f^2+g^2)^{3/2}}\,c\,f\left(2\,\text{ArcCosh}[c\,x]\,\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]-2\,i\,\text{ArcCos}\left[-\frac{c\,f}{g}\right]\,\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\right.$$

$$\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]+2\left(\text{ArcTan}\left[\frac{(c\,f+g)\,\text{Coth}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c\,f+g)\,\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c\,x]\right]}{\sqrt{-c^2\,f^2+g^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{e^{-\frac{1}{2}\,\text{ArcCosh}[c\,x]}\,\sqrt{-c^2\,f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c\,(f+g\,x)}}\right]+\left(\text{ArcCos}\left[-\frac{c\,f}{g}\right]-\right.$$

$$2\left(\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\text{Log}\left[\frac{e^{\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\sqrt{g}\sqrt{c\,(f+g x)}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\text{Log}\left[\frac{(c f+g)\left(c f-g+i\sqrt{-c^2 f^2+g^2}\right)\left(-1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)}{g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\text{Log}\left[\frac{(c f+g)\left(-c f+g+i\sqrt{-c^2 f^2+g^2}\right)\left(1+\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)}{g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(c f-i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)}{g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)}\right]-\right.$$

$$\left.\text{PolyLog}\left[2,\frac{\left(c f+i\sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)}{g\left(c f+g+i\sqrt{-c^2 f^2+g^2}\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right)}\right]\right)\right)\right)$$

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, 27 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) :

$$\frac{(-a g+a c^2 f x)\sqrt{-d\,(-1+c^2 x^2)}}{d^2\,(-c^2 f^2+g^2)\,(-1+c^2 x^2)}+\frac{a g^2\,\text{Log}[f+g x]}{d^{3/2}\,(-c f+g)\,(c f+g)\,\sqrt{-c^2 f^2+g^2}}-\frac{a g^2\,\text{Log}\left[d g+c^2 d f x+\sqrt{d}\,\sqrt{-c^2 f^2+g^2}\,\sqrt{-d\,(-1+c^2 x^2)}\right]}{d^{3/2}\,(-c f+g)\,(c f+g)\,\sqrt{-c^2 f^2+g^2}}-$$

$$\frac{1}{d}\,b\left(-\frac{\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{ArcCosh}[c x]\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{2\,(c f+g)\,\sqrt{-d\,(-1+c x)\,(1+c x)}}+\frac{\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{Log}\left[\text{Cosh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]}{(c f-g)\,\sqrt{-d\,(-1+c x)\,(1+c x)}}+\right.$$

$$\frac{\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\,\text{Log}\left[\text{Sinh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]\right]}{(c f+g)\,\sqrt{-d\,(-1+c x)\,(1+c x)}}+\frac{1}{(-c f+g)\,(c f+g)\,\sqrt{-c^2 f^2+g^2}\,\sqrt{-d\,(-1+c x)\,(1+c x)}}\,g^2\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)$$

$$\left(2\,\text{ArcCosh}[c x]\,\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-2\,i\,\text{ArcCos}\left[-\frac{c f}{g}\right]\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]+\left(\text{ArcCos}\left[-\frac{c f}{g}\right]+\right.\right.$$

$$\left.2\,i\left(-i\,\text{ArcTan}\left[\frac{(c f+g)\,\text{Coth}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-i\,\text{ArcTan}\left[\frac{(-c f+g)\,\text{Tanh}\left[\frac{1}{2}\text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)\,\text{Log}\left[\frac{e^{-\frac{1}{2}\text{ArcCosh}[c x]}\sqrt{-c^2 f^2+g^2}}{\sqrt{2}\,\sqrt{g}\,\sqrt{c f+c g x}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2 i\left(-i \text{ArcTan}\left[\frac{(c f+g)\, \text{Coth}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]-i \text{ArcTan}\left[\frac{(-c f+g)\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{e^{\frac{1}{2} \text{ArcCosh}[c x]} \sqrt{-c^2 f^2+g^2}}{\sqrt{2} \sqrt{g} \sqrt{c f+c g x}}\right]-\left(\text{ArcCos}\left[-\frac{c f}{g}\right]-2 \text{ArcTan}\left[\frac{(-c f+g)\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right)$$

$$\text{Log}\left[1-\frac{\left(c f-i \sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i \sqrt{-c^2 f^2+g^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g\left(c f+g+i \sqrt{-c^2 f^2+g^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]+\left(-\text{ArcCos}\left[-\frac{c f}{g}\right]-\right.$$

$$\left.2 \text{ArcTan}\left[\frac{(-c f+g)\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{\sqrt{-c^2 f^2+g^2}}\right]\right) \text{Log}\left[1-\frac{\left(c f+i \sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i \sqrt{-c^2 f^2+g^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g\left(c f+g+i \sqrt{-c^2 f^2+g^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2, \frac{\left(c f-i \sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i \sqrt{-c^2 f^2+g^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g\left(c f+g+i \sqrt{-c^2 f^2+g^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]-\text{PolyLog}\left[2,\right.\right.$$

$$\left.\left.\left.\frac{\left(c f+i \sqrt{-c^2 f^2+g^2}\right)\left(c f+g-i \sqrt{-c^2 f^2+g^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}{g\left(c f+g+i \sqrt{-c^2 f^2+g^2}\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]\right)}\right]\right)\right)-\frac{\sqrt{\frac{-1+c x}{1+c x}}\,(1+c x)\, \text{ArcCosh}[c x]\, \text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c x]\right]}{2 (c f-g) \sqrt{-d(-1+c x)(1+c x)}}\Bigg)$$

Problem 79: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b \text{ArcCosh}[c x])^2 \text{Log}\left[h (f+g x)^m\right]}{\sqrt{1-c^2 x^2}}\, dx$$

Optimal (type 4, 774 leaves, 14 steps):

$$\frac{m\sqrt{-1+c x}\,\sqrt{1+c x}\,(a+b\,\text{ArcCosh}[c x])^4}{12 b^2 c\sqrt{1-c^2 x^2}}-\frac{m\sqrt{-1+c x}\,\sqrt{1+c x}\,(a+b\,\text{ArcCosh}[c x])^3\,\text{Log}\left[1+\frac{e^{\text{ArcCosh}[c x]} g}{c f-\sqrt{c^2 f^2-g^2}}\right]}{3 b c\sqrt{1-c^2 x^2}}-$$

$$\frac{m\sqrt{-1+c x}\,\sqrt{1+c x}\,(a+b\,\text{ArcCosh}[c x])^3\,\text{Log}\left[1+\frac{e^{\text{ArcCosh}[c x]} g}{c f+\sqrt{c^2 f^2-g^2}}\right]}{3 b c\sqrt{1-c^2 x^2}}+\frac{\sqrt{-1+c x}\,\sqrt{1+c x}\,(a+b\,\text{ArcCosh}[c x])^3\,\text{Log}\left[h\,(f+g x)^m\right]}{3 b c\sqrt{1-c^2 x^2}}-$$

$$\frac{m\sqrt{-1+c x}\,\sqrt{1+c x}\,(a+b\,\text{ArcCosh}[c x])^2\,\text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c x]} g}{c f-\sqrt{c^2 f^2-g^2}}\right]}{c\sqrt{1-c^2 x^2}}-\frac{m\sqrt{-1+c x}\,\sqrt{1+c x}\,(a+b\,\text{ArcCosh}[c x])^2\,\text{PolyLog}\left[2,-\frac{e^{\text{ArcCosh}[c x]} g}{c f+\sqrt{c^2 f^2-g^2}}\right]}{c\sqrt{1-c^2 x^2}}+$$

$$\frac{2 b m\sqrt{-1+c x}\,\sqrt{1+c x}\,(a+b\,\text{ArcCosh}[c x])\,\text{PolyLog}\left[3,-\frac{e^{\text{ArcCosh}[c x]} g}{c f-\sqrt{c^2 f^2-g^2}}\right]}{c\sqrt{1-c^2 x^2}}+$$

$$\frac{2 b m\sqrt{-1+c x}\,\sqrt{1+c x}\,(a+b\,\text{ArcCosh}[c x])\,\text{PolyLog}\left[3,-\frac{e^{\text{ArcCosh}[c x]} g}{c f+\sqrt{c^2 f^2-g^2}}\right]}{c\sqrt{1-c^2 x^2}}-$$

$$\frac{2 b^2 m\sqrt{-1+c x}\,\sqrt{1+c x}\,\text{PolyLog}\left[4,-\frac{e^{\text{ArcCosh}[c x]} g}{c f-\sqrt{c^2 f^2-g^2}}\right]}{c\sqrt{1-c^2 x^2}}-\frac{2 b^2 m\sqrt{-1+c x}\,\sqrt{1+c x}\,\text{PolyLog}\left[4,-\frac{e^{\text{ArcCosh}[c x]} g}{c f+\sqrt{c^2 f^2-g^2}}\right]}{c\sqrt{1-c^2 x^2}}$$

Result (type 1, 1 leaves):

???

Problem 80: 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 81: 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 87: 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 88: 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 89: 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):

$$\frac{-\text{ArcCosh}[a+b x]+\frac{b x\left(-\sqrt{-1+a+b x}\,\sqrt{1+a+b x}+\frac{i a b x\,\text{Log}\left[\frac{4 i\sqrt{1-a^2}\left(-1+a^2+a b x-i\sqrt{1-a^2}\,\sqrt{-1+a+b x}\,\sqrt{1+a+b x}\right)}{a b^2 x}\right]}{\sqrt{1-a^2}}\right)}{-1+a^2}}{2 x^2}$$

Problem 90: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcCosh}[a+b x]}{x^4}\,dx$$

Optimal (type 3, 154 leaves, 7 steps):

$$\frac{b\sqrt{-1+a+b x}\,\sqrt{1+a+b x}}{6\left(1-a^2\right)x^2}+\frac{a b^2\sqrt{-1+a+b x}\,\sqrt{1+a+b x}}{2\left(1-a^2\right)^2 x}-\frac{\text{ArcCosh}[a+b x]}{3 x^3}-\frac{\left(1+2 a^2\right)b^3\,\text{ArcTan}\left[\frac{\sqrt{1-a}\,\sqrt{1+a+b x}}{\sqrt{1+a}\,\sqrt{-1+a+b x}}\right]}{3\left(1-a^2\right)^{5/2}}$$

Result (type 3, 162 leaves):

$$\frac{1}{6}\left(\frac{b\sqrt{-1+a+b x}\,\sqrt{1+a+b x}\,\left(1-a^2+3 a b x\right)}{\left(-1+a^2\right)^2 x^2}-\frac{2\,\text{ArcCosh}[a+b x]}{x^3}-\frac{i\left(1+2 a^2\right)b^3\,\text{Log}\left[\frac{12\left(1-a^2\right)^{3/2}\left(-i+i a^2+i a b x+\sqrt{1-a^2}\,\sqrt{-1+a+b x}\,\sqrt{1+a+b x}\right)}{b^3\left(x+2 a^2 x\right)}\right]}{\left(1-a^2\right)^{5/2}}\right)$$

Problem 125: Result more than twice size of optimal antiderivative.

$$\int \left(a+b\,\text{ArcCosh}[c+d x]\right)^4\,dx$$

Optimal (type 3, 129 leaves, 6 steps):

$$24 b^4 x-\frac{24 b^3\sqrt{-1+c+d x}\,\sqrt{1+c+d x}\,\left(a+b\,\text{ArcCosh}[c+d x]\right)}{d}+\frac{12 b^2(c+d x)\left(a+b\,\text{ArcCosh}[c+d x]\right)^2}{d}-$$
$$\frac{4 b\sqrt{-1+c+d x}\,\sqrt{1+c+d x}\,\left(a+b\,\text{ArcCosh}[c+d x]\right)^3}{d}+\frac{(c+d x)\left(a+b\,\text{ArcCosh}[c+d x]\right)^4}{d}$$

Result (type 3, 261 leaves):

$$\frac{1}{d}\left(\left(a^4+12 a^2 b^2+24 b^4\right)(c+d x)-4 a b\left(a^2+6 b^2\right)\sqrt{-1+c+d x}\sqrt{1+c+d x}-4 b\left(-a^3(c+d x)-6 a b^2(c+d x)+3 a^2 b\sqrt{-1+c+d x}\sqrt{1+c+d x}+6 b^3\sqrt{-1+c+d x}\sqrt{1+c+d x}\right)\text{ArcCosh}[c+d x]+6 b^2\left(a^2(c+d x)+2 b^2(c+d x)-2 a b\sqrt{-1+c+d x}\sqrt{1+c+d x}\right)\text{ArcCosh}[c+d x]^2-4 b^3\left(-a(c+d x)+b\sqrt{-1+c+d x}\sqrt{1+c+d x}\right)\text{ArcCosh}[c+d x]^3+b^4(c+d x)\,\text{ArcCosh}[c+d x]^4\right)$$

Problem 127: 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):

$$\frac{1}{d\,e^2}\left(-\frac{a^4}{c+d\,x}+4\,a^3\,b\left(-\frac{\text{ArcCosh}[c+d\,x]}{c+d\,x}+2\,\text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2}\,\text{ArcCosh}[c+d\,x]\right]\right]\right)-\right.$$
$$6\,i\,a^2\,b^2\left(\text{ArcCosh}[c+d\,x]\left(-\frac{i\,\text{ArcCosh}[c+d\,x]}{c+d\,x}+2\,\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-2\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)+\right.$$
$$\left.2\,\text{PolyLog}\left[2,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-2\,\text{PolyLog}\left[2,\,i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)+$$
$$4\,a\,b^3\left(-\frac{\text{ArcCosh}[c+d\,x]^3}{c+d\,x}+3\,i\left(-\text{ArcCosh}[c+d\,x]^2\left(\text{Log}\left[1-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)-2\,\text{ArcCosh}[c+d\,x]\right.\right.$$
$$\left.\left.\left(\text{PolyLog}\left[2,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-\text{PolyLog}\left[2,\,i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)-2\,\text{PolyLog}\left[3,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+2\,\text{PolyLog}\left[3,\,i\,e^{-\text{ArcCosh}[c+d\,x]}\right]\right)\right)+$$
$$b^4\left(-\frac{7\,i\,\pi^4}{16}+\frac{1}{2}\,\pi^3\,\text{ArcCosh}[c+d\,x]-\frac{3}{2}\,i\,\pi^2\,\text{ArcCosh}[c+d\,x]^2-2\,\pi\,\text{ArcCosh}[c+d\,x]^3+i\,\text{ArcCosh}[c+d\,x]^4-\frac{\text{ArcCosh}[c+d\,x]^4}{c+d\,x}+\right.$$
$$\frac{1}{2}\,\pi^3\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-3\,i\,\pi^2\,\text{ArcCosh}[c+d\,x]\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-6\,\pi\,\text{ArcCosh}[c+d\,x]^2\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+$$
$$4\,i\,\text{ArcCosh}[c+d\,x]^3\,\text{Log}\left[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+3\,i\,\pi^2\,\text{ArcCosh}[c+d\,x]\,\text{Log}\left[1-i\,e^{\text{ArcCosh}[c+d\,x]}\right]+6\,\pi\,\text{ArcCosh}[c+d\,x]^2\,\text{Log}\left[1-i\,e^{\text{ArcCosh}[c+d\,x]}\right]-$$
$$\frac{1}{2}\,\pi^3\,\text{Log}\left[1+i\,e^{\text{ArcCosh}[c+d\,x]}\right]-4\,i\,\text{ArcCosh}[c+d\,x]^3\,\text{Log}\left[1+i\,e^{\text{ArcCosh}[c+d\,x]}\right]+\frac{1}{2}\,\pi^3\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}\left(\pi+2\,i\,\text{ArcCosh}[c+d\,x]\right)\right]\right]+$$
$$3\,i\left(\pi-2\,i\,\text{ArcCosh}[c+d\,x]\right)^2\,\text{PolyLog}\left[2,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-12\,i\,\text{ArcCosh}[c+d\,x]^2\,\text{PolyLog}\left[2,\,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]+$$
$$3\,i\,\pi^2\,\text{PolyLog}\left[2,\,i\,e^{\text{ArcCosh}[c+d\,x]}\right]+12\,\pi\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\left[2,\,i\,e^{\text{ArcCosh}[c+d\,x]}\right]+12\,\pi\,\text{PolyLog}\left[3,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-$$
$$24\,i\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\left[3,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]+24\,i\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\left[3,\,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]-$$
$$\left.\left.12\,\pi\,\text{PolyLog}\left[3,\,i\,e^{\text{ArcCosh}[c+d\,x]}\right]-24\,i\,\text{PolyLog}\left[4,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\right]-24\,i\,\text{PolyLog}\left[4,\,-i\,e^{\text{ArcCosh}[c+d\,x]}\right]\right)\right)$$

Problem 128: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{ArcCosh}[c+d\,x]\right)^4}{\left(c\,e+d\,e\,x\right)^3}\,dx$$

Optimal (type 4, 195 leaves, 10 steps):

$$-\frac{2\,b\left(a+b\,\text{ArcCosh}[c+d\,x]\right)^3}{d\,e^3}+\frac{2\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\,\left(a+b\,\text{ArcCosh}[c+d\,x]\right)^3}{d\,e^3\,(c+d\,x)}-$$
$$\frac{\left(a+b\,\text{ArcCosh}[c+d\,x]\right)^4}{2\,d\,e^3\,(c+d\,x)^2}-\frac{6\,b^2\left(a+b\,\text{ArcCosh}[c+d\,x]\right)^2\,\text{Log}\left[1+e^{-2\,\text{ArcCosh}[c+d\,x]}\right]}{d\,e^3}+$$
$$\frac{6\,b^3\left(a+b\,\text{ArcCosh}[c+d\,x]\right)\,\text{PolyLog}\left[2,\,-e^{-2\,\text{ArcCosh}[c+d\,x]}\right]}{d\,e^3}+\frac{3\,b^4\,\text{PolyLog}\left[3,\,-e^{-2\,\text{ArcCosh}[c+d\,x]}\right]}{d\,e^3}$$

Result (type 4, 398 leaves):

$$\frac{1}{2\,d\,e^3}\left(-\frac{a^4}{(c+d\,x)^2}+\frac{4\,a^3\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}}{c+d\,x}-\frac{4\,a^3\,b\,\text{ArcCosh}[c+d\,x]}{(c+d\,x)^2}-\right.$$

$$\frac{b^4\,\text{ArcCosh}[c+d\,x]^4}{(c+d\,x)^2}+12\,a^2\,b^2\left(\frac{\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]}{c+d\,x}-\frac{\text{ArcCosh}[c+d\,x]^2}{2\,(c+d\,x)^2}-\text{Log}[c+d\,x]\right)+$$

$$4\,a\,b^3\left(-\text{ArcCosh}[c+d\,x]\left(3\,\text{ArcCosh}[c+d\,x]-\frac{3\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]}{c+d\,x}+\frac{\text{ArcCosh}[c+d\,x]^2}{(c+d\,x)^2}+6\,\text{Log}\left[1+e^{-2\,\text{ArcCosh}[c+d\,x]}\right]\right)+\right.$$

$$\left.3\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcCosh}[c+d\,x]}\right]\right)+$$

$$2\,b^4\left(2\,\text{ArcCosh}[c+d\,x]^2\left(-\text{ArcCosh}[c+d\,x]+\frac{\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]}{c+d\,x}-3\,\text{Log}\left[1+e^{-2\,\text{ArcCosh}[c+d\,x]}\right]\right)+\right.$$

$$\left.\left.6\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcCosh}[c+d\,x]}\right]+3\,\text{PolyLog}\left[3,-e^{-2\,\text{ArcCosh}[c+d\,x]}\right]\right)\right)$$

Problem 129: 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):

$$\frac{2 b^2 (a + b \text{ArcCosh}[c + d x])^2}{d e^4 (c + d x)} + \frac{2 b \sqrt{-1 + c + d x} \sqrt{1 + c + d x} (a + b \text{ArcCosh}[c + d x])^3}{3 d e^4 (c + d x)^2} - \frac{(a + b \text{ArcCosh}[c + d x])^4}{3 d e^4 (c + d x)^3} -$$

$$\frac{8 b^3 (a + b \text{ArcCosh}[c + d x]) \text{ArcTan}\left[e^{\text{ArcCosh}[c+d x]}\right]}{d e^4} + \frac{4 b (a + b \text{ArcCosh}[c + d x])^3 \text{ArcTan}\left[e^{\text{ArcCosh}[c+d x]}\right]}{3 d e^4} +$$

$$\frac{4 i b^4 \text{PolyLog}\left[2, -i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4} - \frac{2 i b^2 (a + b \text{ArcCosh}[c + d x])^2 \text{PolyLog}\left[2, -i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4} - \frac{4 i b^4 \text{PolyLog}\left[2, i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4} +$$

$$\frac{2 i b^2 (a + b \text{ArcCosh}[c + d x])^2 \text{PolyLog}\left[2, i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4} + \frac{4 i b^3 (a + b \text{ArcCosh}[c + d x]) \text{PolyLog}\left[3, -i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4} -$$

$$\frac{4 i b^3 (a + b \text{ArcCosh}[c + d x]) \text{PolyLog}\left[3, i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4} - \frac{4 i b^4 \text{PolyLog}\left[4, -i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4} + \frac{4 i b^4 \text{PolyLog}\left[4, i e^{\text{ArcCosh}[c+d x]}\right]}{d e^4}$$

Result (type 4, 1374 leaves):

$$-\frac{a^4}{3 d e^4 (c + d x)^3} + \frac{4 a^3 b \sqrt{-1 + c + d x} \left(\frac{\sqrt{\frac{-1+c+d x}{1+c+d x}} (1+c+d x)}{6 (c+d x)^2} - \frac{\text{ArcCosh}[c+d x]}{3 (c+d x)^3} + \frac{1}{3} \text{ArcTan}\left[\text{Tanh}\left[\frac{1}{2} \text{ArcCosh}[c + d x]\right]\right]\right)}{d e^4 \sqrt{\frac{-1+c+d x}{1+c+d x}} \sqrt{1 + c + d x}} +$$

$$\left(2 a^2 b^2 \sqrt{-1 + c + d x} \left(\frac{1}{c + d x} + \frac{\sqrt{\frac{-1+c+d x}{1+c+d x}} (1 + c + d x) \text{ArcCosh}[c + d x]}{(c + d x)^2} - \frac{\text{ArcCosh}[c + d x]^2}{(c + d x)^3} - i \text{ArcCosh}[c + d x] \text{Log}\left[1 - i e^{-\text{ArcCosh}[c+d x]}\right] + \right.\right.$$

$$\left.\left. i \text{ArcCosh}[c + d x] \text{Log}\left[1 + i e^{-\text{ArcCosh}[c+d x]}\right] - i \text{PolyLog}\left[2, -i e^{-\text{ArcCosh}[c+d x]}\right] + i \text{PolyLog}\left[2, i e^{-\text{ArcCosh}[c+d x]}\right]\right)\right) \Big/$$

$$\left(d e^4 \sqrt{\frac{-1 + c + d x}{1 + c + d x}} \sqrt{1 + c + d x}\right) + \frac{1}{d e^4 \sqrt{\frac{-1+c+d x}{1+c+d x}} \sqrt{1 + c + d x}} 4 a b^3 \sqrt{-1 + c + d x}$$

$$\left(\frac{\text{ArcCosh}[c+d\,x]}{c+d\,x}+\frac{\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]^2}{2\,(c+d\,x)^2}-\frac{\text{ArcCosh}[c+d\,x]^3}{3\,(c+d\,x)^3}-\frac{1}{2}\,i\,\Big(-4\,i\,\text{ArcTan}\Big[\text{Tanh}\Big[\frac{1}{2}\,\text{ArcCosh}[c+d\,x]\Big]\Big]+\right.$$

$$\text{ArcCosh}[c+d\,x]^2\,\text{Log}\Big[1-i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]-\text{ArcCosh}[c+d\,x]^2\,\text{Log}\Big[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]+2\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\Big[2,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]-$$

$$\left.2\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\Big[2,\,i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]+2\,\text{PolyLog}\Big[3,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]-2\,\text{PolyLog}\Big[3,\,i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]\Big)\right)+$$

$$\frac{1}{d\,e^4\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\sqrt{1+c+d\,x}}\,b^4\,\sqrt{-1+c+d\,x}\,\left(\frac{1}{2}\,i\,\left(8+\pi^2-4\,i\,\pi\,\text{ArcCosh}[c+d\,x]-4\,\text{ArcCosh}[c+d\,x]^2\right)\text{PolyLog}\Big[2,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]-\right.$$

$$\frac{1}{96}\,i\,\left(7\,\pi^4+8\,i\,\pi^3\,\text{ArcCosh}[c+d\,x]+24\,\pi^2\,\text{ArcCosh}[c+d\,x]^2+\frac{192\,i\,\text{ArcCosh}[c+d\,x]^2}{c+d\,x}-32\,i\,\pi\,\text{ArcCosh}[c+d\,x]^3+\right.$$

$$\frac{64\,i\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]^3}{(c+d\,x)^2}-16\,\text{ArcCosh}[c+d\,x]^4-\frac{32\,i\,\text{ArcCosh}[c+d\,x]^4}{(c+d\,x)^3}-$$

$$384\,\text{ArcCosh}[c+d\,x]\,\text{Log}\Big[1-i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]+8\,i\,\pi^3\,\text{Log}\Big[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]+384\,\text{ArcCosh}[c+d\,x]\,\text{Log}\Big[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]+$$

$$48\,\pi^2\,\text{ArcCosh}[c+d\,x]\,\text{Log}\Big[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]-96\,i\,\pi\,\text{ArcCosh}[c+d\,x]^2\,\text{Log}\Big[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]-$$

$$64\,\text{ArcCosh}[c+d\,x]^3\,\text{Log}\Big[1+i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]-48\,\pi^2\,\text{ArcCosh}[c+d\,x]\,\text{Log}\Big[1-i\,e^{\text{ArcCosh}[c+d\,x]}\Big]+$$

$$96\,i\,\pi\,\text{ArcCosh}[c+d\,x]^2\,\text{Log}\Big[1-i\,e^{\text{ArcCosh}[c+d\,x]}\Big]-8\,i\,\pi^3\,\text{Log}\Big[1+i\,e^{\text{ArcCosh}[c+d\,x]}\Big]+64\,\text{ArcCosh}[c+d\,x]^3\,\text{Log}\Big[1+i\,e^{\text{ArcCosh}[c+d\,x]}\Big]+$$

$$8\,i\,\pi^3\,\text{Log}\Big[\text{Tan}\Big[\frac{1}{4}\,(\pi+2\,i\,\text{ArcCosh}[c+d\,x])\Big]\Big]+384\,\text{PolyLog}\Big[2,\,i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]+192\,\text{ArcCosh}[c+d\,x]^2\,\text{PolyLog}\Big[2,\,-i\,e^{\text{ArcCosh}[c+d\,x]}\Big]-$$

$$48\,\pi^2\,\text{PolyLog}\Big[2,\,i\,e^{\text{ArcCosh}[c+d\,x]}\Big]+192\,i\,\pi\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\Big[2,\,i\,e^{\text{ArcCosh}[c+d\,x]}\Big]+192\,i\,\pi\,\text{PolyLog}\Big[3,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]+$$

$$384\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\Big[3,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]-384\,\text{ArcCosh}[c+d\,x]\,\text{PolyLog}\Big[3,\,-i\,e^{\text{ArcCosh}[c+d\,x]}\Big]-$$

$$\left.\left.192\,i\,\pi\,\text{PolyLog}\Big[3,\,i\,e^{\text{ArcCosh}[c+d\,x]}\Big]+384\,\text{PolyLog}\Big[4,\,-i\,e^{-\text{ArcCosh}[c+d\,x]}\Big]+384\,\text{PolyLog}\Big[4,\,-i\,e^{\text{ArcCosh}[c+d\,x]}\Big]\right)\right)$$

Problem 166: 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):

$$\frac{1}{1728\,d}e^2\Bigg(432\,a^2\,c\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+1620\,b^2\,c\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+432\,a^2\,d\,x\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+1620\,b^2\,d\,x\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-$$

$$1080\,a\,b\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-1080\,a\,b\,c\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-$$

$$1080\,a\,b\,d\,x\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+864\,a\,b\,c\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+$$

$$864\,a\,b\,d\,x\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-1080\,b^2\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-$$

$$1080\,b^2\,c\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}-1080\,b^2\,d\,x\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+$$

$$432\,b^2\,c\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+432\,b^2\,d\,x\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}+$$

$$144\,a^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+60\,b^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+288\,a\,b\,\text{ArcCosh}[c+d\,x]$$

$$\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+144\,b^2\,\text{ArcCosh}[c+d\,x]^2\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]-$$

$$405\,b^{5/2}\,\sqrt{\pi}\,\text{Cosh}\Big[\frac{a}{b}\Big]\,\text{Erfi}\Big[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]-5\,b^{5/2}\,\sqrt{3\,\pi}\,\text{Cosh}\Big[\frac{3\,a}{b}\Big]\,\text{Erfi}\Big[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]+$$

$$405\,b^{5/2}\,\sqrt{\pi}\,\text{Erfi}\Big[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\,\text{Sinh}\Big[\frac{a}{b}\Big]-405\,b^{5/2}\,\sqrt{\pi}\,\text{Erf}\Big[\frac{\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\,\Big(\text{Cosh}\Big[\frac{a}{b}\Big]+\text{Sinh}\Big[\frac{a}{b}\Big]\Big)+$$

$$5\,b^{5/2}\,\sqrt{3\,\pi}\,\text{Erfi}\Big[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\,\text{Sinh}\Big[\frac{3\,a}{b}\Big]-5\,b^{5/2}\,\sqrt{3\,\pi}\,\text{Erf}\Big[\frac{\sqrt{3}\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}}{\sqrt{b}}\Big]\,\Big(\text{Cosh}\Big[\frac{3\,a}{b}\Big]+\text{Sinh}\Big[\frac{3\,a}{b}\Big]\Big)-$$

$$120\,a\,b\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]-120\,b^2\,\text{ArcCosh}[c+d\,x]\,\sqrt{a+b\,\text{ArcCosh}[c+d\,x]}\,\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]\Bigg)$$

Problem 170: 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) :

$$\frac{1}{10\,368\, d} e^2 \Bigg(2592\, a^3 c \sqrt{a+b\, \text{ArcCosh}[c+d x]}+22\,680\, a\, b^2 c \sqrt{a+b\, \text{ArcCosh}[c+d x]}+$$
$$2592\, a^3 d x \sqrt{a+b\, \text{ArcCosh}[c+d x]}+22\,680\, a\, b^2 d x \sqrt{a+b\, \text{ArcCosh}[c+d x]}-9072\, a^2 b \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \sqrt{a+b\, \text{ArcCosh}[c+d x]}-$$
$$34\,020\, b^3 \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \sqrt{a+b\, \text{ArcCosh}[c+d x]}-9072\, a^2 b\, c \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \sqrt{a+b\, \text{ArcCosh}[c+d x]}-$$
$$34\,020\, b^3 c \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \sqrt{a+b\, \text{ArcCosh}[c+d x]}-9072\, a^2 b\, d x \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \sqrt{a+b\, \text{ArcCosh}[c+d x]}-$$
$$34\,020\, b^3 d x \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \sqrt{a+b\, \text{ArcCosh}[c+d x]}+7776\, a^2 b\, c\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}+$$
$$22\,680\, b^3 c\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}+7776\, a^2 b\, d x\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}+$$
$$22\,680\, b^3 d x\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}-18\,144\, a\, b^2 \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}-$$
$$18\,144\, a\, b^2 c \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}-18\,144\, a\, b^2 d x \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}+$$
$$7776\, a\, b^2 c\, \text{ArcCosh}[c+d x]^2 \sqrt{a+b\, \text{ArcCosh}[c+d x]}+7776\, a\, b^2 d x\, \text{ArcCosh}[c+d x]^2 \sqrt{a+b\, \text{ArcCosh}[c+d x]}-$$

$$9072\, b^3 \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \text{ArcCosh}[c+d x]^2 \sqrt{a+b\, \text{ArcCosh}[c+d x]} - 9072\, b^3 c \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \text{ArcCosh}[c+d x]^2 \sqrt{a+b\, \text{ArcCosh}[c+d x]} -$$

$$9072\, b^3 d x \sqrt{\frac{-1+c+d x}{1+c+d x}}\, \text{ArcCosh}[c+d x]^2 \sqrt{a+b\, \text{ArcCosh}[c+d x]} + 2592\, b^3 c\, \text{ArcCosh}[c+d x]^3 \sqrt{a+b\, \text{ArcCosh}[c+d x]} +$$

$$2592\, b^3 d x\, \text{ArcCosh}[c+d x]^3 \sqrt{a+b\, \text{ArcCosh}[c+d x]} + 864\, a^3 \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Cosh}[3\, \text{ArcCosh}[c+d x]] +$$

$$840\, a\, b^2 \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Cosh}[3\, \text{ArcCosh}[c+d x]] + 2592\, a^2 b\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Cosh}[3\, \text{ArcCosh}[c+d x]] +$$

$$840\, b^3\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Cosh}[3\, \text{ArcCosh}[c+d x]] +$$

$$2592\, a\, b^2\, \text{ArcCosh}[c+d x]^2 \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Cosh}[3\, \text{ArcCosh}[c+d x]] +$$

$$864\, b^3\, \text{ArcCosh}[c+d x]^3 \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Cosh}[3\, \text{ArcCosh}[c+d x]] + 8505\, b^{7/2} \sqrt{\pi}\, \text{Cosh}\left[\frac{a}{b}\right] \text{Erfi}\left[\frac{\sqrt{a+b\, \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right] +$$

$$35\, b^{7/2} \sqrt{3\pi}\, \text{Cosh}\left[\frac{3a}{b}\right] \text{Erfi}\left[\frac{\sqrt{3} \sqrt{a+b\, \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right] - 8505\, b^{7/2} \sqrt{\pi}\, \text{Erfi}\left[\frac{\sqrt{a+b\, \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right] \text{Sinh}\left[\frac{a}{b}\right] -$$

$$8505\, b^{7/2} \sqrt{\pi}\, \text{Erf}\left[\frac{\sqrt{a+b\, \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right] \left(\text{Cosh}\left[\frac{a}{b}\right] + \text{Sinh}\left[\frac{a}{b}\right]\right) - 35\, b^{7/2} \sqrt{3\pi}\, \text{Erfi}\left[\frac{\sqrt{3} \sqrt{a+b\, \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right] \text{Sinh}\left[\frac{3a}{b}\right] -$$

$$35\, b^{7/2} \sqrt{3\pi}\, \text{Erf}\left[\frac{\sqrt{3} \sqrt{a+b\, \text{ArcCosh}[c+d x]}}{\sqrt{b}}\right] \left(\text{Cosh}\left[\frac{3a}{b}\right] + \text{Sinh}\left[\frac{3a}{b}\right]\right) - 1008\, a^2 b \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Sinh}[3\, \text{ArcCosh}[c+d x]] -$$

$$420\, b^3 \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Sinh}[3\, \text{ArcCosh}[c+d x]] - 2016\, a\, b^2\, \text{ArcCosh}[c+d x] \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Sinh}[3\, \text{ArcCosh}[c+d x]] -$$

$$\left. 1008\, b^3\, \text{ArcCosh}[c+d x]^2 \sqrt{a+b\, \text{ArcCosh}[c+d x]}\, \text{Sinh}[3\, \text{ArcCosh}[c+d x]] \right)$$

Problem 198: Result unnecessarily involves imaginary or complex numbers.

$$\int (c e + d e x)^{7/2} (a + b\, \text{ArcCosh}[c+d x])\, dx$$

Optimal (type 4, 189 leaves, 8 steps):

$$-\frac{28\, b\, e^2 \sqrt{-1+c+d x}\, (e (c+d x))^{3/2} \sqrt{1+c+d x}}{405\, d} - \frac{4\, b \sqrt{-1+c+d x}\, (e (c+d x))^{7/2} \sqrt{1+c+d x}}{81\, d} +$$

$$\frac{2\, (e (c+d x))^{9/2} (a+b\, \text{ArcCosh}[c+d x])}{9\, d\, e} - \frac{28\, b\, e^3 \sqrt{1-c-d x} \sqrt{e (c+d x)}\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{1+c+d x}}{\sqrt{2}}\right], 2\right]}{135\, d \sqrt{-c-d x} \sqrt{-1+c+d x}}$$

Result (type 4, 219 leaves):

$$\frac{1}{135\,d}\left(e\,(c+d\,x)\right)^{7/2}\left(30\,a\,(c+d\,x)-\frac{28\,b}{\sqrt{-1+c+d\,x}\,(c+d\,x)^{5/2}\sqrt{\frac{c+d\,x}{1+c+d\,x}}}-\frac{4\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\,\left(7+5\,c^2+10\,c\,d\,x+5\,d^2\,x^2\right)}{3\,(c+d\,x)^2}+\right.$$

$$\left.30\,b\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]-\frac{28\,i\,b\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{(c+d\,x)^{7/2}\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right)$$

Problem 199: Result unnecessarily involves imaginary or complex numbers.

$$\int (c\,e+d\,e\,x)^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,dx$$

Optimal (type 4, 169 leaves, 8 steps):

$$-\frac{20\,b\,e^2\,\sqrt{-1+c+d\,x}\,\sqrt{e\,(c+d\,x)}\,\sqrt{1+c+d\,x}}{147\,d}-\frac{4\,b\,\sqrt{-1+c+d\,x}\,\left(e\,(c+d\,x)\right)^{5/2}\sqrt{1+c+d\,x}}{49\,d}+$$

$$\frac{2\,\left(e\,(c+d\,x)\right)^{7/2}\,(a+b\,\text{ArcCosh}[c+d\,x])}{7\,d\,e}-\frac{20\,b\,e^{5/2}\,\sqrt{1-c-d\,x}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{e\,(c+d\,x)}}{\sqrt{e}}\right],-1\right]}{147\,d\,\sqrt{-1+c+d\,x}}$$

Result (type 4, 164 leaves):

$$\frac{1}{147\,d\,(c+d\,x)^2}2\,\left(e\,(c+d\,x)\right)^{5/2}\left(21\,a\,(c+d\,x)^3-2\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\,\left(5+3\,c^2+6\,c\,d\,x+3\,d^2\,x^2\right)+\right.$$

$$\left.21\,b\,(c+d\,x)^3\,\text{ArcCosh}[c+d\,x]-\frac{10\,i\,b\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}\,\sqrt{1+c+d\,x}}\right)$$

Problem 200: 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):

$$\frac{1}{25 d} 2 (e (c+d x))^{3/2} \left(5 a (c+d x)-\frac{6 b}{\sqrt{-1+c+d x} \sqrt{c+d x} \sqrt{\frac{c+d x}{1+c+d x}}}-2 b \sqrt{-1+c+d x} \sqrt{1+c+d x}+5 b (c+d x) \text{ArcCosh}[c+d x]-\frac{6 i b \sqrt{\frac{c+d x}{1+c+d x}} \sqrt{\frac{1+c+d x}{-1+c+d x}}\, \text{EllipticE}\left[i \text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d x}}\right], 2\right]}{(c+d x)^{3/2} \sqrt{\frac{c+d x}{-1+c+d x}}}\right)$$

Problem 201: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{c e+d e x}\, (a+b \text{ArcCosh}[c+d x])\, dx$$

Optimal (type 4, 127 leaves, 6 steps):

$$-\frac{4 b \sqrt{-1+c+d x} \sqrt{e (c+d x)} \sqrt{1+c+d x}}{9 d}+\frac{2 (e (c+d x))^{3/2} (a+b \text{ArcCosh}[c+d x])}{3 d e}-\frac{4 b \sqrt{e} \sqrt{1-c-d x}\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{e (c+d x)}}{\sqrt{e}}\right], -1\right]}{9 d \sqrt{-1+c+d x}}$$

Result (type 4, 133 leaves):

$$\frac{1}{9 d} 2 \sqrt{e (c+d x)} \left(3 a (c+d x)-2 b \sqrt{-1+c+d x} \sqrt{1+c+d x}+3 b (c+d x) \text{ArcCosh}[c+d x]-\frac{2 i b \sqrt{\frac{1+c+d x}{-1+c+d x}}\, \text{EllipticF}\left[i \text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d x}}\right], 2\right]}{\sqrt{\frac{c+d x}{-1+c+d x}} \sqrt{1+c+d x}}\right)$$

Problem 202: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{a + b \operatorname{ArcCosh}[c + d x]}{\sqrt{c e + d e x}} \, dx$$

Optimal (type 4, 104 leaves, 4 steps):

$$\frac{2 \sqrt{e (c + d x)} \, (a + b \operatorname{ArcCosh}[c + d x])}{d e} - \frac{4 b \sqrt{1 - c - d x} \sqrt{e (c + d x)} \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{1+c+d x}}{\sqrt{2}}\right], 2\right]}{d e \sqrt{-c - d x} \sqrt{-1 + c + d x}}$$

Result (type 4, 163 leaves):

$$\frac{1}{d \sqrt{e (c + d x)}} 2 \left(a (c + d x) - \frac{2 b (c + d x)^{3/2}}{\sqrt{-1 + c + d x} \sqrt{\frac{c+d x}{1+c+d x}}} + b (c + d x) \operatorname{ArcCosh}[c + d x] - \frac{2 i b \sqrt{c + d x} \sqrt{\frac{c+d x}{1+c+d x}} \sqrt{\frac{1+c+d x}{-1+c+d x}} \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d x}}\right], 2\right]}{\sqrt{\frac{c+d x}{-1+c+d x}}} \right)$$

Problem 203: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{a + b \operatorname{ArcCosh}[c + d x]}{(c e + d e x)^{3/2}} \, dx$$

Optimal (type 4, 84 leaves, 4 steps):

$$-\frac{2 (a + b \operatorname{ArcCosh}[c + d x])}{d e \sqrt{e (c + d x)}} + \frac{4 b \sqrt{1 - c - d x} \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{e (c+d x)}}{\sqrt{e}}\right], -1\right]}{d e^{3/2} \sqrt{-1 + c + d x}}$$

Result (type 4, 115 leaves):

$$\frac{-2 \sqrt{1 + c + d x} \, (a + b \operatorname{ArcCosh}[c + d x]) + \frac{4 i b (c+d x) \sqrt{\frac{1+c+d x}{-1+c+d x}} \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d x}}\right], 2\right]}{\sqrt{\frac{c+d x}{-1+c+d x}}}}{d e \sqrt{e (c + d x)} \sqrt{1 + c + d x}}$$

Problem 204: 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):

$$\frac{4\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}}{3\,d\,e^2\,\sqrt{e\,(c+d\,x)}}-\frac{2\,(a+b\,\text{ArcCosh}[c+d\,x])}{3\,d\,e\,(e\,(c+d\,x))^{3/2}}-\frac{4\,b\,\sqrt{1-c-d\,x}\,\sqrt{e\,(c+d\,x)}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{1+c+d\,x}}{\sqrt{2}}\right],2\right]}{3\,d\,e^3\,\sqrt{-c-d\,x}\,\sqrt{-1+c+d\,x}}$$

Result (type 4, 197 leaves):

$$\frac{1}{3\,d\,(e\,(c+d\,x))^{5/2}}2\left(-a\,(c+d\,x)-\frac{2\,b\,(c+d\,x)^{7/2}}{\sqrt{-1+c+d\,x}\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}}+2\,b\,\sqrt{-1+c+d\,x}\,(c+d\,x)^2\,\sqrt{1+c+d\,x}-\right.$$
$$\left.b\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]-\frac{2\,i\,b\,(c+d\,x)^{5/2}\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right)$$

Problem 205: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{a+b\,\text{ArcCosh}[c+d\,x]}{(c\,e+d\,e\,x)^{7/2}}\,dx$$

Optimal (type 4, 130 leaves, 7 steps):

$$\frac{4\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}}{15\,d\,e^2\,(e\,(c+d\,x))^{3/2}}-\frac{2\,(a+b\,\text{ArcCosh}[c+d\,x])}{5\,d\,e\,(e\,(c+d\,x))^{5/2}}+\frac{4\,b\,\sqrt{1-c-d\,x}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{e\,(c+d\,x)}}{\sqrt{e}}\right],-1\right]}{15\,d\,e^{7/2}\,\sqrt{-1+c+d\,x}}$$

Result (type 4, 121 leaves):

$$\frac{1}{15\,d\,e\,(e\,(c+d\,x))^{5/2}}2\left(-3\,a+2\,b\,c\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}+\right.$$
$$\left.2\,b\,d\,x\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}-3\,b\,\text{ArcCosh}[c+d\,x]-i\,\sqrt{2}\,b\,(c+d\,x)^{5/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-1+c+d\,x}\right],\frac{1}{2}\right]\right)$$

Problem 206: 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, 153 leaves, 3 steps):

$$\frac{2 (e (c+d x))^{9/2} (a+b \text{ArcCosh}[c+d x])^2}{9 d e}-\frac{8 b \sqrt{1-c-d x} (e (c+d x))^{11/2} (a+b \text{ArcCosh}[c+d x]) \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{11}{4},\frac{15}{4},(c+d x)^2\right]}{99 d e^2 \sqrt{-1+c+d x}}-\frac{16 b^2 (e (c+d x))^{13/2} \text{HypergeometricPFQ}\left[\left\{1,\frac{13}{4},\frac{13}{4}\right\},\left\{\frac{15}{4},\frac{17}{4}\right\},(c+d x)^2\right]}{1287 d e^3}$$

Result (type 5, 303 leaves):

$$\frac{1}{9 d} (e (c+d x))^{7/2} \left(2 a^2 (c+d x)+4 a b (c+d x) \text{ArcCosh}[c+d x]-\frac{8 a b \sqrt{\frac{c+d x}{1+c+d x}} \left(\frac{21+14 (c+d x)+2 (c+d x)^3+5 (c+d x)^5}{\sqrt{-1+c+d x}}+\frac{21 i \sqrt{\frac{1+c+d x}{-1+c+d x}} \text{EllipticE}\left[i \text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d x}}\right],2\right]}{\sqrt{\frac{c+d x}{-1+c+d x}}}\right)}{45 (c+d x)^{7/2}}+\frac{2}{11} b^2 (c+d x) \text{ArcCosh}[c+d x] \left(11 \text{ArcCosh}[c+d x]+4 (c+d x) \sqrt{\frac{-1+c+d x}{1+c+d x}} (1+c+d x) \text{Hypergeometric2F1}\left[1,\frac{13}{4},\frac{15}{4},(c+d x)^2\right]\right)-\frac{945 b^2 \pi (c+d x)^3 \text{HypergeometricPFQ}\left[\left\{1,\frac{13}{4},\frac{13}{4}\right\},\left\{\frac{15}{4},\frac{17}{4}\right\},(c+d x)^2\right]}{512 \sqrt{2} \text{Gamma}\left[\frac{15}{4}\right] \text{Gamma}\left[\frac{17}{4}\right]}\right)$$

Problem 207: 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, 153 leaves, 3 steps):

$$\frac{2\,(e\,(c+d\,x))^{7/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{7\,d\,e}-\frac{8\,b\,\sqrt{1-c-d\,x}\,(e\,(c+d\,x))^{9/2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{9}{4},\frac{13}{4},(c+d\,x)^2\right]}{63\,d\,e^2\,\sqrt{-1+c+d\,x}}-\frac{16\,b^2\,(e\,(c+d\,x))^{11/2}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{11}{4},\frac{11}{4}\right\},\left\{\frac{13}{4},\frac{15}{4}\right\},(c+d\,x)^2\right]}{693\,d\,e^3}$$

Result (type 5, 369 leaves):

$$\frac{1}{6174\,d\,(c+d\,x)^2}\,(e\,(c+d\,x))^{5/2}\left(1764\,a^2\,(c+d\,x)^3+3528\,a\,b\,(c+d\,x)^3\,\text{ArcCosh}[c+d\,x]-\frac{1}{\sqrt{1+c+d\,x}}\right.$$

$$336\,a\,b\left(\sqrt{-1+c+d\,x}\,\left(5+5\,(c+d\,x)+3\,(c+d\,x)^2+3\,(c+d\,x)^3\right)+\frac{5\,i\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right)+$$

$$b^2\left(1336\,(c+d\,x)-1932\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]+1323\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]^2+72\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+441\right.$$

$$\text{ArcCosh}[c+d\,x]^2\,\text{Cosh}[3\,\text{ArcCosh}[c+d\,x]]+1680\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{5}{4},(c+d\,x)^2\right]-$$

$$\left.\left.\frac{210\,\sqrt{2}\,\pi\,(c+d\,x)\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]}{\text{Gamma}\left[\frac{5}{4}\right]\,\text{Gamma}\left[\frac{7}{4}\right]}-252\,\text{ArcCosh}[c+d\,x]\,\text{Sinh}[3\,\text{ArcCosh}[c+d\,x]]\right)\right)$$

Problem 208: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int(c\,e+d\,e\,x)^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2\,dx$$

Optimal (type 5, 153 leaves, 3 steps):

$$\frac{2\,(e\,(c+d\,x))^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{5\,d\,e}-\frac{8\,b\,\sqrt{1-c-d\,x}\,(e\,(c+d\,x))^{7/2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{7}{4},\frac{11}{4},(c+d\,x)^2\right]}{35\,d\,e^2\,\sqrt{-1+c+d\,x}}-\frac{16\,b^2\,(e\,(c+d\,x))^{9/2}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{9}{4},\frac{9}{4}\right\},\left\{\frac{11}{4},\frac{13}{4}\right\},(c+d\,x)^2\right]}{315\,d\,e^3}$$

Result (type 5, 326 leaves):

$$\frac{1}{5\,d}(e\,(c+d\,x))^{3/2}\left(2\,a^2\,(c+d\,x)+4\,a\,b\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]+\frac{8}{5}\,a\,b\left(-\frac{3}{\sqrt{-1+c+d\,x}\,\sqrt{c+d\,x}\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}}-\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}-\frac{3\,i\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{(c+d\,x)^{3/2}\,\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}\right)+\frac{2}{7}\,b^2\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]\left(7\,\text{ArcCosh}[c+d\,x]+4\,(c+d\,x)\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{Hypergeometric2F1}\left[1,\frac{9}{4},\frac{11}{4},(c+d\,x)^2\right]\right)-\frac{15\,b^2\,\pi\,(c+d\,x)^3\,\text{HypergeometricPFQ}\left[\left\{1,\frac{9}{4},\frac{9}{4}\right\},\left\{\frac{11}{4},\frac{13}{4}\right\},(c+d\,x)^2\right]}{32\,\sqrt{2}\,\text{Gamma}\left[\frac{11}{4}\right]\,\text{Gamma}\left[\frac{13}{4}\right]}\right)$$

Problem 209: 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, 153 leaves, 3 steps):

$$\frac{2\,(e\,(c+d\,x))^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{3\,d\,e}-\frac{8\,b\,\sqrt{1-c-d\,x}\,(e\,(c+d\,x))^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5}{4},\frac{9}{4},(c+d\,x)^2\right]}{15\,d\,e^2\,\sqrt{-1+c+d\,x}}-\frac{16\,b^2\,(e\,(c+d\,x))^{7/2}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{7}{4},\frac{7}{4}\right\},\left\{\frac{9}{4},\frac{11}{4}\right\},(c+d\,x)^2\right]}{105\,d\,e^3}$$

Result (type 5, 298 leaves):

$$\frac{1}{27\,d}\sqrt{e\,(c+d\,x)}\left(18\,a^2\,(c+d\,x)-24\,a\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}+36\,a\,b\,(c+d\,x)\,\text{ArcCosh}[c+d\,x]-24\,b^2\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]+\right.$$

$$2\,b^2\,(c+d\,x)\,\left(8+9\,\text{ArcCosh}[c+d\,x]^2\right)-\frac{24\,i\,a\,b\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}\,\sqrt{1+c+d\,x}}+24\,b^2\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)$$

$$\left.\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{5}{4},(c+d\,x)^2\right]-\frac{3\,\sqrt{2}\,b^2\,\pi\,(c+d\,x)\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]}{\text{Gamma}\left[\frac{5}{4}\right]\,\text{Gamma}\left[\frac{7}{4}\right]}\right)$$

Problem 210: 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, 151 leaves, 3 steps) :

$$\frac{2\,\sqrt{e\,(c+d\,x)}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{d\,e}-\frac{8\,b\,\sqrt{1-c-d\,x}\,(e\,(c+d\,x))^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},(c+d\,x)^2\right]}{3\,d\,e^2\,\sqrt{-1+c+d\,x}}-$$

$$\frac{16\,b^2\,(e\,(c+d\,x))^{5/2}\,\text{HypergeometricPFQ}\left[\left\{1,\frac{5}{4},\frac{5}{4}\right\},\left\{\frac{7}{4},\frac{9}{4}\right\},(c+d\,x)^2\right]}{15\,d\,e^3}$$

Result (type 5, 268 leaves) :

$$\frac{1}{12\,d\,\sqrt{e\,(c+d\,x)}}\left(24\,a^2\,(c+d\,x)+48\,a\,b\left((c+d\,x)\,\text{ArcCosh}[c+d\,x]-\frac{1}{\sqrt{-1+c+d\,x}\,\sqrt{c+d\,x}}\right.\right.$$

$$\left.\left.2\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\left(c+d\,x+(c+d\,x)^2+\mathrm{i}\,(-1+c+d\,x)^{3/2}\,\sqrt{\frac{c+d\,x}{-1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]\right)\right)+\right.$$

$$b^2\,(c+d\,x)\left(-\frac{3\,\sqrt{2}\,\pi\,(c+d\,x)^2\,\text{HypergeometricPFQ}\left[\left\{1,\frac{5}{4},\frac{5}{4}\right\},\left\{\frac{7}{4},\frac{9}{4}\right\},(c+d\,x)^2\right]}{\text{Gamma}\left[\frac{7}{4}\right]\,\text{Gamma}\left[\frac{9}{4}\right]}+\right.$$

$$\left.\left.8\,\text{ArcCosh}[c+d\,x]\left(3\,\text{ArcCosh}[c+d\,x]+2\,\text{Hypergeometric2F1}\left[1,\frac{5}{4},\frac{7}{4},(c+d\,x)^2\right]\,\text{Sinh}[2\,\text{ArcCosh}[c+d\,x]]\right)\right)\right)$$

Problem 211: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(a+b\,\text{ArcCosh}[c+d\,x])^2}{(c\,e+d\,e\,x)^{3/2}}\,dx$$

Optimal (type 5, 149 leaves, 3 steps):

$$-\frac{2\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{d\,e\,\sqrt{e\,(c+d\,x)}}+\frac{8\,b\,\sqrt{1-c-d\,x}\,\sqrt{e\,(c+d\,x)}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},(c+d\,x)^2\right]}{d\,e^2\,\sqrt{-1+c+d\,x}}+$$

$$\frac{16\,b^2\,(e\,(c+d\,x))^{3/2}\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]}{3\,d\,e^3}$$

Result (type 5, 208 leaves):

$$\frac{1}{d\,e\,\sqrt{e\,(c+d\,x)}}\left(\frac{8\,i\,a\,b\,\sqrt{c+d\,x}\,\sqrt{\frac{c+d\,x}{1+c+d\,x}}\,\sqrt{\frac{1+c+d\,x}{-1+c+d\,x}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d\,x}}\right],2\right]}{\sqrt{\frac{c+d\,x}{-1+c+d\,x}}}+\frac{\sqrt{2}\,b^2\,\pi\,(c+d\,x)^2\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]}{\text{Gamma}\left[\frac{5}{4}\right]\,\text{Gamma}\left[\frac{7}{4}\right]}-2\left((a+b\,\text{ArcCosh}[c+d\,x])^2+2\,b^2\,\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{5}{4},(c+d\,x)^2\right]\,\text{Sinh}[2\,\text{ArcCosh}[c+d\,x]]\right)\right)$$

Problem 212: 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, 153 leaves, 3 steps):

$$-\frac{2\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{3\,d\,e\,(e\,(c+d\,x))^{3/2}}-\frac{8\,b\,\sqrt{1-c-d\,x}\,(a+b\,\text{ArcCosh}[c+d\,x])\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},(c+d\,x)^2\right]}{3\,d\,e^2\,\sqrt{-1+c+d\,x}\,\sqrt{e\,(c+d\,x)}}-\frac{16\,b^2\,\sqrt{e\,(c+d\,x)}\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{4},1\right\},\left\{\frac{3}{4},\frac{5}{4}\right\},(c+d\,x)^2\right]}{3\,d\,e^3}$$

Result (type 5, 347 leaves):

$$\frac{1}{3 d (e (c+d x))^{5/2}}\Bigg(-2 a^2 (c+d x)-16 b^2 (c+d x)^3-4 a b (c+d x) \text{ArcCosh}[c+d x]+$$

$$8 b^2 (c+d x)^2 \sqrt{\frac{-1+c+d x}{1+c+d x}} (1+c+d x) \text{ArcCosh}[c+d x]-2 b^2 (c+d x) \text{ArcCosh}[c+d x]^2-\frac{1}{\sqrt{-1+c+d x}}$$

$$8 a b (c+d x)^{3/2} \sqrt{\frac{c+d x}{1+c+d x}} \left(1+c+d x+i (-1+c+d x)^{3/2} \sqrt{\frac{c+d x}{-1+c+d x}} \sqrt{\frac{1+c+d x}{-1+c+d x}} \text{EllipticE}\left[i \text{ArcSinh}\left[\frac{1}{\sqrt{-1+c+d x}}\right],2\right]\right)+$$

$$\frac{8}{3} b^2 (c+d x)^4 \sqrt{\frac{-1+c+d x}{1+c+d x}} (1+c+d x) \text{ArcCosh}[c+d x] \text{Hypergeometric2F1}\left[1,\frac{5}{4},\frac{7}{4},(c+d x)^2\right]-$$

$$\frac{b^2 \pi (c+d x)^5 \text{HypergeometricPFQ}\left[\left\{1,\frac{5}{4},\frac{5}{4}\right\},\left\{\frac{7}{4},\frac{9}{4}\right\},(c+d x)^2\right]}{2 \sqrt{2} \text{Gamma}\left[\frac{7}{4}\right] \text{Gamma}\left[\frac{9}{4}\right]}\Bigg)$$

Problem 213: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+b \text{ArcCosh}[c+d x])^2}{(c e+d e x)^{7/2}} \, dx$$

Optimal (type 5, 153 leaves, 3 steps):

$$-\frac{2 (a+b \text{ArcCosh}[c+d x])^2}{5 d e (e (c+d x))^{5/2}}-\frac{8 b \sqrt{1-c-d x} (a+b \text{ArcCosh}[c+d x]) \text{Hypergeometric2F1}\left[-\frac{3}{4},\frac{1}{2},\frac{1}{4},(c+d x)^2\right]}{15 d e^2 \sqrt{-1+c+d x} (e (c+d x))^{3/2}}+$$

$$\frac{16 b^2 \text{HypergeometricPFQ}\left[\left\{-\frac{1}{4},-\frac{1}{4},1\right\},\left\{\frac{1}{4},\frac{3}{4}\right\},(c+d x)^2\right]}{15 d e^3 \sqrt{e (c+d x)}}$$

Result (type 5, 272 leaves):

$$\frac{1}{15\, d\, e\, (e\,(c+d\,x))^{5/2}}\left(-6\,a^2+4\,a\,b\left(-3\,\text{ArcCosh}[c+d\,x]+(c+d\,x)\left(2\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}-i\sqrt{2}\,(c+d\,x)^{3/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-1+c+d\,x}\right],\frac{1}{2}\right]\right)\right)+\right.$$

$$b^2\left(16\,(c+d\,x)^2+8\,(c+d\,x)\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\,\text{ArcCosh}[c+d\,x]-6\,\text{ArcCosh}[c+d\,x]^2-8\,(c+d\,x)^3\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,(1+c+d\,x)\right.$$

$$\left.\left.\text{ArcCosh}[c+d\,x]\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{5}{4},(c+d\,x)^2\right]+\frac{\sqrt{2}\,\pi\,(c+d\,x)^4\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{4},\frac{3}{4},1\right\},\left\{\frac{5}{4},\frac{7}{4}\right\},(c+d\,x)^2\right]}{\text{Gamma}\left[\frac{5}{4}\right]\,\text{Gamma}\left[\frac{7}{4}\right]}\right)\right)$$

Problem 214: 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 9, 88 leaves, 2 steps):

$$\frac{2\,(e\,(c+d\,x))^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^3}{5\,d\,e}-\frac{6\,b\,\text{Unintegrable}\left[\frac{(e\,(c+d\,x))^{5/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}},x\right]}{5\,e}$$

Result (type 1, 1 leaves):

???

Problem 215: 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 9, 86 leaves, 2 steps):

$$\frac{2\,(e\,(c+d\,x))^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^3}{3\,d\,e}-\frac{2\,b\,\text{Unintegrable}\left[\frac{(e\,(c+d\,x))^{3/2}\,(a+b\,\text{ArcCosh}[c+d\,x])^2}{\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}},x\right]}{e}$$

Result (type 1, 1 leaves):

???

Problem 219: Attempted integration timed out after 120 seconds.

$$\int \frac{(a + b \operatorname{ArcCosh}[c + d x])^3}{(c e + d e x)^{7/2}} \, dx$$

Optimal (type 9, 88 leaves, 2 steps):

$$-\frac{2 (a + b \operatorname{ArcCosh}[c + d x])^3}{5 d e (e (c + d x))^{5/2}} + \frac{6 b \operatorname{Unintegrable}\left[\frac{(a+b \operatorname{ArcCosh}[c+d x])^2}{\sqrt{-1+c+d x} \, (e (c+d x))^{5/2} \sqrt{1+c+d x}}, x\right]}{5 e}$$

Result (type 1, 1 leaves):

???

Problem 221: Attempted integration timed out after 120 seconds.

$$\int \sqrt{c e + d e x} \, (a + b \operatorname{ArcCosh}[c + d x])^4 \, dx$$

Optimal (type 9, 88 leaves, 2 steps):

$$\frac{2 (e (c + d x))^{3/2} (a + b \operatorname{ArcCosh}[c + d x])^4}{3 d e} - \frac{8 b \operatorname{Unintegrable}\left[\frac{(e (c+d x))^{3/2} (a+b \operatorname{ArcCosh}[c+d x])^3}{\sqrt{-1+c+d x} \sqrt{1+c+d x}}, x\right]}{3 e}$$

Result (type 1, 1 leaves):

???

Problem 225: Attempted integration timed out after 120 seconds.

$$\int \frac{(a + b \operatorname{ArcCosh}[c + d x])^4}{(c e + d e x)^{7/2}} \, dx$$

Optimal (type 9, 88 leaves, 2 steps):

$$-\frac{2 (a + b \operatorname{ArcCosh}[c + d x])^4}{5 d e (e (c + d x))^{5/2}} + \frac{8 b \operatorname{Unintegrable}\left[\frac{(a+b \operatorname{ArcCosh}[c+d x])^3}{\sqrt{-1+c+d x} \, (e (c+d x))^{5/2} \sqrt{1+c+d x}}, x\right]}{5 e}$$

Result (type 1, 1 leaves):

???

Problem 228: Unable to integrate problem.

$$\int (c\,e + d\,e\,x)^m \left(a + b\,\text{ArcCosh}[c + d\,x]\right)^2 \, dx$$

Optimal (type 5, 206 leaves, 3 steps):

$$\frac{(e\,(c + d\,x))^{1+m} \left(a + b\,\text{ArcCosh}[c + d\,x]\right)^2}{d\,e\,(1 + m)} - \frac{2\,b\,\sqrt{1 - c - d\,x}\,(e\,(c + d\,x))^{2+m} \left(a + b\,\text{ArcCosh}[c + d\,x]\right) \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, (c + d\,x)^2\right]}{d\,e^2\,(1 + m)\,(2 + m)\,\sqrt{-1 + c + d\,x}} - \frac{2\,b^2\,(e\,(c + d\,x))^{3+m}\,\text{HypergeometricPFQ}\left[\left\{1, \frac{3}{2} + \frac{m}{2}, \frac{3}{2} + \frac{m}{2}\right\}, \left\{2 + \frac{m}{2}, \frac{5}{2} + \frac{m}{2}\right\}, (c + d\,x)^2\right]}{d\,e^3\,(1 + m)\,(2 + m)\,(3 + m)}$$

Result (type 8, 25 leaves):

$$\int (c\,e + d\,e\,x)^m \left(a + b\,\text{ArcCosh}[c + d\,x]\right)^2 \, dx$$

Problem 229: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (c\,e + d\,e\,x)^m \left(a + b\,\text{ArcCosh}[c + d\,x]\right) \, dx$$

Optimal (type 5, 118 leaves, 5 steps):

$$\frac{(e\,(c + d\,x))^{1+m} \left(a + b\,\text{ArcCosh}[c + d\,x]\right)}{d\,e\,(1 + m)} - \frac{b\,(e\,(c + d\,x))^{2+m} \left(1 - (c + d\,x)^2\right) \text{Hypergeometric2F1}\left[1, \frac{3+m}{2}, \frac{4+m}{2}, (c + d\,x)^2\right]}{d\,e^2\,(1 + m)\,(2 + m)\,\sqrt{-1 + c + d\,x}\,\sqrt{1 + c + d\,x}}$$

Result (type 6, 398 leaves):

$$\frac{1}{d\,(1+m)}\,(e\,(c+d\,x))^m\,\Bigg(-\Bigg(\Bigg(12\,b\,\sqrt{-1+c+d\,x}\,\sqrt{1+c+d\,x}\,\text{AppellF1}\Big[\frac{1}{2},\,-m,\,-\frac{1}{2},\,\frac{3}{2},\,1-c-d\,x,\,\frac{1}{2}\,(1-c-d\,x)\Big]\Bigg)\Bigg/$$

$$\Bigg(6\,\text{AppellF1}\Big[\frac{1}{2},\,-m,\,-\frac{1}{2},\,\frac{3}{2},\,1-c-d\,x,\,\frac{1}{2}\,(1-c-d\,x)\Big]+$$

$$(-1+c+d\,x)\,\Bigg(4\,m\,\text{AppellF1}\Big[\frac{3}{2},\,1-m,\,-\frac{1}{2},\,\frac{5}{2},\,1-c-d\,x,\,\frac{1}{2}\,(1-c-d\,x)\Big]+\text{AppellF1}\Big[\frac{3}{2},\,-m,\,\frac{1}{2},\,\frac{5}{2},\,1-c-d\,x,\,\frac{1}{2}\,(1-c-d\,x)\Big]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(12\,b\,\sqrt{\frac{-1+c+d\,x}{1+c+d\,x}}\,\text{AppellF1}\Big[\frac{1}{2},\,-m,\,\frac{1}{2},\,\frac{3}{2},\,1-c-d\,x,\,\frac{1}{2}\,(1-c-d\,x)\Big]\Bigg)\Bigg/\Bigg(6\,\text{AppellF1}\Big[\frac{1}{2},\,-m,\,\frac{1}{2},\,\frac{3}{2},\,1-c-d\,x,\,\frac{1}{2}\,(1-c-d\,x)\Big]+$$

$$(-1+c+d\,x)\,\Bigg(4\,m\,\text{AppellF1}\Big[\frac{3}{2},\,1-m,\,\frac{1}{2},\,\frac{5}{2},\,1-c-d\,x,\,\frac{1}{2}\,(1-c-d\,x)\Big]-\text{AppellF1}\Big[\frac{3}{2},\,-m,\,\frac{3}{2},\,\frac{5}{2},\,1-c-d\,x,\,\frac{1}{2}\,(1-c-d\,x)\Big]\Bigg)\Bigg)+(c+$$

$$d\,x)\,(a+b\,\text{ArcCosh}[c+d\,x])\Bigg)$$

Problem 239: 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):

$$\text{ArcCosh}[a\,x^n]\,\text{Log}[x]+$$

$$\Bigg(a\,\sqrt{1-a^2\,x^{2\,n}}\,\Bigg(\text{ArcSinh}\Big[\sqrt{-a^2}\,x^n\Big]^2+2\,\text{ArcSinh}\Big[\sqrt{-a^2}\,x^n\Big]\,\text{Log}\Big[1-e^{-2\,\text{ArcSinh}[\sqrt{-a^2}\,x^n]}\Big]-2\,n\,\text{Log}[x]\,\text{Log}\Big[\sqrt{-a^2}\,x^n+\sqrt{1-a^2\,x^{2\,n}}\Big]-$$

$$\text{PolyLog}\Big[2,\,e^{-2\,\text{ArcSinh}[\sqrt{-a^2}\,x^n]}\Big]\Bigg)\Bigg)\Bigg/\Bigg(2\,\sqrt{-a^2}\,n\,\sqrt{-1+a\,x^n}\,\sqrt{1+a\,x^n}\Bigg)$$

Problem 269: 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 270: 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, 196 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 271: 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 274: 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 278: 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):

$$\frac{(a+b\,x)\left(a+b\,x+\sqrt{-1+a+b\,x}\,\sqrt{1+a+b\,x}\right)-\text{Log}\left[a+b\,x+\sqrt{-1+a+b\,x}\,\sqrt{1+a+b\,x}\right]}{2\,b}$$

Problem 279: 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 280: 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 281: 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):

$$-\frac{a}{2 x^2}-\frac{b}{x}+\frac{b \sqrt{-1+a+b x}\ \sqrt{1+a+b x}}{2 \left(1-a^2\right) x}-\frac{\sqrt{-1+a+b x}\ \left(1+a+b x\right)^{3/2}}{2 \left(1+a\right) x^2}-\frac{b^2 \operatorname{ArcTan}\left[\frac{\sqrt{1-a}\ \sqrt{1+a+b x}}{\sqrt{1+a}\ \sqrt{-1+a+b x}}\right]}{\left(1-a^2\right)^{3/2}}$$

Result (type 3, 142 leaves):

$$\frac{1}{2}\left(-\frac{a}{x^2}-\frac{2 b}{x}-\frac{\sqrt{-1+a+b x}\ \sqrt{1+a+b x}\ \left(-1+a^2+a b x\right)}{\left(-1+a^2\right) x^2}-\frac{i b^2 \operatorname{Log}\left[\frac{4 i \sqrt{1-a^2}\ \left(-1+a^2+a b x-i \sqrt{1-a^2}\ \sqrt{-1+a+b x}\ \sqrt{1+a+b x}\right)}{b^2 x}\right]}{\left(1-a^2\right)^{3/2}}\right)$$

Problem 282: 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):

$$-\frac{a}{3 x^3}-\frac{b}{2 x^2}+\frac{a b^2 \sqrt{-1+a+b x} \sqrt{1+a+b x}}{2 \left(1-a^2\right)^2 x}-\frac{a b \sqrt{-1+a+b x} \left(1+a+b x\right)^{3/2}}{2 (1-a) (1+a)^2 x^2}+\frac{(-1+a+b x)^{3/2} (1+a+b x)^{3/2}}{3 \left(1-a^2\right) x^3}-\frac{a b^3 \text{ArcTan}\left[\frac{\sqrt{1-a} \sqrt{1+a+b x}}{\sqrt{1+a} \sqrt{-1+a+b x}}\right]}{\left(1-a^2\right)^{5/2}}$$

Result (type 3, 179 leaves):

$$\frac{1}{6} \left(-\frac{2 a}{x^3}-\frac{3 b}{x^2}+\frac{\sqrt{-1+a+b x} \sqrt{1+a+b x} \left(-2-2 a^4+a b x-a^3 b x+2 b^2 x^2+a^2 \left(4+b^2 x^2\right)\right)}{\left(-1+a^2\right)^2 x^3}-\frac{3 i a b^3 \text{Log}\left[\frac{4 \left(1-a^2\right)^{3/2} \left(-i+i a^2+i a b x+\sqrt{1-a^2} \sqrt{-1+a+b x} \sqrt{1+a+b x}\right)}{a b^3 x}\right]}{\left(1-a^2\right)^{5/2}}\right)$$

Problem 283: 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):

$$-\frac{a}{4 x^4}-\frac{b}{3 x^3}-\frac{\sqrt{-1+a+b x} \sqrt{1+a+b x}}{4 x^4}+\frac{a b \sqrt{-1+a+b x} \sqrt{1+a+b x}}{12 \left(1-a^2\right) x^3}+\frac{\left(3+2 a^2\right) b^2 \sqrt{-1+a+b x} \sqrt{1+a+b x}}{24 \left(1-a^2\right)^2 x^2}+\frac{a \left(13+2 a^2\right) b^3 \sqrt{-1+a+b x} \sqrt{1+a+b x}}{24 \left(1-a^2\right)^3 x}-\frac{\left(1+4 a^2\right) b^4 \text{ArcTan}\left[\frac{\sqrt{1-a} \sqrt{1+a+b x}}{\sqrt{1+a} \sqrt{-1+a+b x}}\right]}{4 \left(1-a^2\right)^{7/2}}$$

Result (type 3, 198 leaves):

$$\frac{1}{24}\left(-\frac{6a}{x^4}-\frac{8b}{x^3}-\frac{\sqrt{-1+a+bx}\,\sqrt{1+a+bx}\left(6+\frac{2abx}{-1+a^2}-\frac{(3+2a^2)\,b^2x^2}{(-1+a^2)^2}+\frac{a\,(13+2a^2)\,b^3x^3}{(-1+a^2)^3}\right)}{x^4}-\frac{3\,\mathrm{i}\,(1+4a^2)\,b^4\,\mathrm{Log}\left[\frac{16\,\mathrm{i}\,(1-a^2)^{5/2}\left(-1+a^2+abx-\mathrm{i}\sqrt{1-a^2}\,\sqrt{-1+a+bx}\,\sqrt{1+a+bx}\right)}{b^4\,(x+4a^2x)}\right]}{(1-a^2)^{7/2}}\right)$$

Problem 294: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{ArcCosh}\left[\frac{c}{a+bx}\right]\,dx$$

Optimal (type 3, 58 leaves, 5 steps):

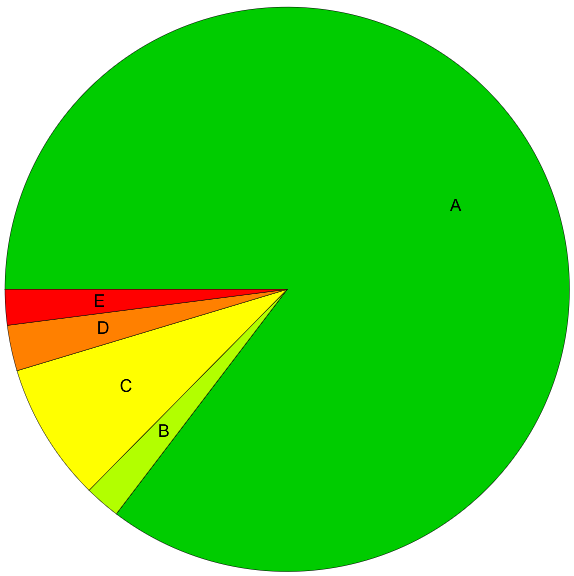
$$\frac{(a+bx)\,\mathrm{ArcSech}\left[\frac{a}{c}+\frac{bx}{c}\right]}{b}-\frac{2c\,\mathrm{ArcTan}\left[\sqrt{\frac{\left(1-\frac{a}{c}\right)c-bx}{a+c+bx}}\right]}{b}$$

Result (type 3, 143 leaves):

$$x\,\mathrm{ArcCosh}\left[\frac{c}{a+bx}\right]+\frac{\sqrt{a-c+bx}\left(\mathrm{i}\,a\,\mathrm{Log}\left[-\frac{2b^2\left(-\mathrm{i}\,c+\sqrt{a-c+bx}\,\sqrt{a+c+bx}\right)}{a\,(a+bx)}\right]+c\,\mathrm{Log}\left[a+bx+\sqrt{a-c+bx}\,\sqrt{a+c+bx}\right]\right)}{b\sqrt{-\frac{a-c+bx}{a+c+bx}}\,\sqrt{a+c+bx}}$$

Summary of Integration Test Results

1031 integration problems



A - 880 optimal antiderivatives

B - 21 more than twice size of optimal antiderivatives

C - 82 unnecessarily complex antiderivatives

D - 27 unable to integrate problems

E - 21 integration timeouts