Maple 2018.2 Integration Test Results
on the problems in "7 Inverse hyperbolic functions/7.2 Inverse hyperbolic cosine"

Test results for the 47 problems in "7.2.2 (d x)^m (a+b arccosh(c x))^n.txt"

Problem 13: Unable to integrate problem.

$$\int \frac{\operatorname{arccosh}(a x)^4}{x^2}\, dx$$

Optimal(type 4, 229 leaves, 11 steps):

$$-\frac{\operatorname{arccosh}(a x)^4}{x} + 8 a \operatorname{arccosh}(a x)^3 \arctan\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right) - 12 I a \operatorname{arccosh}(a x)^2 \operatorname{polylog}\left(2, -I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) + 12 I a \operatorname{arccosh}(a x)^2 \operatorname{polylog}\left(2, I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) + 24 I a \operatorname{arccosh}(a x) \operatorname{polylog}\left(3, -I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) - 24 I a \operatorname{arccosh}(a x) \operatorname{polylog}\left(3, I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) - 24 I a \operatorname{polylog}\left(4, -I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) + 24 I a \operatorname{polylog}\left(4, I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right)$$

Result(type 8, 12 leaves):

$$\int \frac{\operatorname{arccosh}(a x)^4}{x^2}\, dx$$

Problem 14: Unable to integrate problem.

$$\int \frac{\operatorname{arccosh}(a x)^4}{x^4}\, dx$$

Optimal(type 4, 372 leaves, 19 steps):

$$\frac{2 a^2 \operatorname{arccosh}(a x)^2}{x} - \frac{\operatorname{arccosh}(a x)^4}{3 x^3} - 8 a^3 \operatorname{arccosh}(a x) \arctan\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right) + \frac{4 a^3 \operatorname{arccosh}(a x)^3 \arctan\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)}{3} + 4 I a^3 \operatorname{polylog}\left(2, -I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) - 2 I a^3 \operatorname{arccosh}(a x)^2 \operatorname{polylog}\left(2, -I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) - 4 I a^3 \operatorname{polylog}\left(2, I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) + 2 I a^3 \operatorname{arccosh}(a x)^2 \operatorname{polylog}\left(2, I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) + 4 I a^3 \operatorname{arccosh}(a x) \operatorname{polylog}\left(3, -I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) - 4 I a^3 \operatorname{arccosh}(a x) \operatorname{polylog}\left(3, I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) - 4 I a^3 \operatorname{polylog}\left(4, -I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) + 4 I a^3 \operatorname{polylog}\left(4, I\left(a x + \sqrt{a x - 1}\, \sqrt{a x + 1}\right)\right) + \frac{2 a \operatorname{arccosh}(a x)^3 \sqrt{a x - 1}\, \sqrt{a x + 1}}{3 x^2}$$

Result(type 8, 12 leaves):

$$\int \frac{\operatorname{arccosh}(a x)^4}{x^4}\, dx$$

Problem 24: Unable to integrate problem.

$$\int x^2 \operatorname{arccosh}(a x)^{3/2}\,dx$$

Optimal(type 4, 139 leaves, 22 steps):

$$\frac{x^3 \operatorname{arccosh}(a x)^{3/2}}{3} - \frac{\operatorname{erf}\left(\sqrt{3}\,\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{3}\,\sqrt{\pi}}{288\,a^3} + \frac{\operatorname{erfi}\left(\sqrt{3}\,\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{3}\,\sqrt{\pi}}{288\,a^3} - \frac{3\operatorname{erf}\left(\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{\pi}}{32\,a^3} + \frac{3\operatorname{erfi}\left(\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{\pi}}{32\,a^3} - \frac{\sqrt{a x-1}\,\sqrt{a x+1}\,\sqrt{\operatorname{arccosh}(a x)}}{3\,a^3} - \frac{x^2\sqrt{a x-1}\,\sqrt{a x+1}\,\sqrt{\operatorname{arccosh}(a x)}}{6\,a}$$

Result(type 8, 12 leaves):

$$\int x^2 \operatorname{arccosh}(a x)^{3/2}\,dx$$

Problem 26: Unable to integrate problem.

$$\int \frac{x^3}{\sqrt{\operatorname{arccosh}(a x)}}\,dx$$

Optimal(type 4, 79 leaves, 13 steps):

$$-\frac{\operatorname{erf}\left(\sqrt{2}\,\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{2}\,\sqrt{\pi}}{16\,a^4} + \frac{\operatorname{erfi}\left(\sqrt{2}\,\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{2}\,\sqrt{\pi}}{16\,a^4} - \frac{\operatorname{erf}\left(2\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{\pi}}{32\,a^4} + \frac{\operatorname{erfi}\left(2\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{\pi}}{32\,a^4}$$

Result(type 8, 12 leaves):

$$\int \frac{x^3}{\sqrt{\operatorname{arccosh}(a x)}}\,dx$$

Problem 27: Unable to integrate problem.

$$\int \frac{x^2}{\sqrt{\operatorname{arccosh}(a x)}}\,dx$$

Optimal(type 4, 75 leaves, 13 steps):

$$-\frac{\operatorname{erf}\left(\sqrt{3}\,\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{3}\,\sqrt{\pi}}{24\,a^3} + \frac{\operatorname{erfi}\left(\sqrt{3}\,\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{3}\,\sqrt{\pi}}{24\,a^3} - \frac{\operatorname{erf}\left(\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{\pi}}{8\,a^3} + \frac{\operatorname{erfi}\left(\sqrt{\operatorname{arccosh}(a x)}\right)\sqrt{\pi}}{8\,a^3}$$

Result(type 8, 12 leaves):

$$\int \frac{x^2}{\sqrt{\operatorname{arccosh}(a x)}}\,dx$$

Problem 32: Unable to integrate problem.

$$\int x^m \operatorname{arccosh}(a x)^2\,dx$$

Optimal(type 5, 132 leaves, 2 steps):

$$\frac{x^{1+m}\operatorname{arccosh}(a x)^2}{1+m}-\frac{2 a^2 x^{3+m}\mathit{HypergeometricPFQ}\left(\left[1,\frac{3}{2}+\frac{m}{2},\frac{3}{2}+\frac{m}{2}\right],\left[2+\frac{m}{2},\frac{5}{2}+\frac{m}{2}\right],a^2 x^2\right)}{m^3+6 m^2+11 m+6}$$
$$-\frac{2 a x^{2+m}\operatorname{arccosh}(a x)\ \operatorname{hypergeom}\left(\left[\frac{1}{2},1+\frac{m}{2}\right],\left[2+\frac{m}{2}\right],a^2 x^2\right)\sqrt{-a x+1}}{\left(m^2+3 m+2\right)\sqrt{a x-1}}$$

Result(type 8, 12 leaves):

$$\int x^m \operatorname{arccosh}(a x)^2\, dx$$

Problem 33: Unable to integrate problem.

$$\int x^m \operatorname{arccosh}(a x)\, dx$$

Optimal(type 5, 81 leaves, 4 steps):

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

Result(type 8, 10 leaves):

$$\int x^m \operatorname{arccosh}(a x)\, dx$$

Problem 39: Result unnecessarily involves higher level functions.

$$\int \operatorname{arccosh}(a x)^n\, dx$$

Optimal(type 4, 45 leaves, 4 steps):

$$\frac{\operatorname{arccosh}(a x)^n\,\Gamma(1+n,-\operatorname{arccosh}(a x))}{2 a\,(-\operatorname{arccosh}(a x))^n}+\frac{\Gamma(1+n,\operatorname{arccosh}(a x))}{2 a}$$

Result(type 5, 39 leaves):

$$\frac{\operatorname{arccosh}(a x)^{2+n}\operatorname{hypergeom}\left(\left[1+\frac{n}{2}\right],\left[\frac{3}{2},2+\frac{n}{2}\right],\frac{\operatorname{arccosh}(a x)^2}{4}\right)}{a\,(2+n)}$$

Problem 41: Unable to integrate problem.

$$\int x^2\sqrt{a+b\operatorname{arccosh}(c x)}\, dx$$

Optimal(type 4, 162 leaves, 14 steps):

$$-\frac{e^{\frac{3a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{3}\,\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{\sqrt{b}}\right)\sqrt{b}\,\sqrt{3}\,\sqrt{\pi}}{144\,c^3}-\frac{\mathrm{erfi}\left(\frac{\sqrt{3}\,\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{\sqrt{b}}\right)\sqrt{b}\,\sqrt{3}\,\sqrt{\pi}}{144\,c^3\,e^{\frac{3a}{b}}}-\frac{e^{\frac{a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{\sqrt{b}}\right)\sqrt{b}\,\sqrt{\pi}}{16\,c^3}$$

$$-\frac{\mathrm{erfi}\left(\frac{\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{\sqrt{b}}\right)\sqrt{b}\,\sqrt{\pi}}{16\,c^3\,e^{\frac{a}{b}}}+\frac{x^3\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{3}$$

Result(type 8, 16 leaves):

$$\int x^2\sqrt{a+b\,\mathrm{arccosh}(c\,x)}\,dx$$

Problem 42: Unable to integrate problem.

$$\int (a+b\,\mathrm{arccosh}(c\,x))^{3/2}\,dx$$

Optimal(type 4, 109 leaves, 8 steps):

$$x\,(a+b\,\mathrm{arccosh}(c\,x))^{3/2}-\frac{3\,b^{3/2}\,e^{\frac{a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{\sqrt{b}}\right)\sqrt{\pi}}{8\,c}+\frac{3\,b^{3/2}\,\mathrm{erfi}\left(\frac{\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{\sqrt{b}}\right)\sqrt{\pi}}{8\,c\,e^{\frac{a}{b}}}$$

$$-\frac{3\,b\sqrt{c\,x-1}\,\sqrt{c\,x+1}\,\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{2\,c}$$

Result(type 8, 12 leaves):

$$\int (a+b\,\mathrm{arccosh}(c\,x))^{3/2}\,dx$$

Problem 43: Unable to integrate problem.

$$\int x^2\,(a+b\,\mathrm{arccosh}(c\,x))^{5/2}\,dx$$

Optimal(type 4, 262 leaves, 24 steps):

$$\frac{x^3\,(a+b\,\mathrm{arccosh}(c\,x))^{5/2}}{3}-\frac{5\,b^{5/2}\,e^{\frac{3a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{3}\,\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{\sqrt{b}}\right)\sqrt{3}\,\sqrt{\pi}}{1728\,c^3}-\frac{5\,b^{5/2}\,\mathrm{erfi}\left(\frac{\sqrt{3}\,\sqrt{a+b\,\mathrm{arccosh}(c\,x)}}{\sqrt{b}}\right)\sqrt{3}\,\sqrt{\pi}}{1728\,c^3\,e^{\frac{3a}{b}}}$$

$$- \frac{15 b^{5/2} e^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arccosh}(cx)}}{\sqrt{b}}\right)\sqrt{\pi}}{64 c^3} - \frac{15 b^{5/2} \operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arccosh}(cx)}}{\sqrt{b}}\right)\sqrt{\pi}}{64 c^3 e^{\frac{a}{b}}} - \frac{5 b (a+b\operatorname{arccosh}(cx))^{3/2}\sqrt{cx-1}\sqrt{cx+1}}{9 c^3}$$

$$- \frac{5 b x^2 (a+b\operatorname{arccosh}(cx))^{3/2}\sqrt{cx-1}\sqrt{cx+1}}{18 c} + \frac{5 b^2 x \sqrt{a+b\operatorname{arccosh}(cx)}}{6 c^2} + \frac{5 b^2 x^3 \sqrt{a+b\operatorname{arccosh}(cx)}}{36}$$

Result(type 8, 16 leaves):

$$\int x^2 (a+b\operatorname{arccosh}(cx))^{5/2}\, dx$$

Problem 44: Unable to integrate problem.

$$\int \frac{x}{\sqrt{a+b\operatorname{arccosh}(cx)}}\, dx$$

Optimal(type 4, 81 leaves, 8 steps):

$$- \frac{e^{\frac{2a}{b}} \operatorname{erf}\left(\frac{\sqrt{2}\sqrt{a+b\operatorname{arccosh}(cx)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{8 c^2 \sqrt{b}} + \frac{\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\operatorname{arccosh}(cx)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{8 c^2 e^{\frac{2a}{b}} \sqrt{b}}$$

Result(type 8, 14 leaves):

$$\int \frac{x}{\sqrt{a+b\operatorname{arccosh}(cx)}}\, dx$$

Problem 45: Unable to integrate problem.

$$\int \frac{x}{(a+b\operatorname{arccosh}(cx))^{3/2}}\, dx$$

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

$$\frac{e^{\frac{2a}{b}} \operatorname{erf}\left(\frac{\sqrt{2}\sqrt{a+b\operatorname{arccosh}(cx)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{2 b^{3/2} c^2} + \frac{\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\operatorname{arccosh}(cx)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{2 b^{3/2} c^2 e^{\frac{2a}{b}}} - \frac{2 x \sqrt{cx-1}\sqrt{cx+1}}{b c \sqrt{a+b\operatorname{arccosh}(cx)}}$$

Result(type 8, 14 leaves):

$$\int \frac{x}{(a+b\operatorname{arccosh}(cx))^{3/2}}\, dx$$

Problem 46: Unable to integrate problem.

$$\int \frac{1}{(a+b\operatorname{arccosh}(cx))^{3/2}}\,dx$$

Optimal(type 4, 97 leaves, 7 steps):

$$\frac{e^{\frac{a}{b}}\operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arccosh}(cx)}}{\sqrt{b}}\right)\sqrt{\pi}}{b^{3/2}c}+\frac{\operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arccosh}(cx)}}{\sqrt{b}}\right)\sqrt{\pi}}{b^{3/2}c\,e^{\frac{a}{b}}}-\frac{2\sqrt{cx-1}\sqrt{cx+1}}{bc\sqrt{a+b\operatorname{arccosh}(cx)}}$$

Result(type 8, 12 leaves):

$$\int \frac{1}{(a+b\operatorname{arccosh}(cx))^{3/2}}\,dx$$

Problem 47: Unable to integrate problem.

$$\int (dx)^m (a+b\operatorname{arccosh}(cx))\,dx$$

Optimal(type 5, 96 leaves, 4 steps):

$$\frac{(dx)^{1+m}(a+b\operatorname{arccosh}(cx))}{d(1+m)}-\frac{bc(dx)^{2+m}\operatorname{hypergeom}\left(\left[\frac{1}{2},1+\frac{m}{2}\right],\left[2+\frac{m}{2}\right],c^2x^2\right)\sqrt{-c^2x^2+1}}{d^2(1+m)(2+m)\sqrt{cx-1}\sqrt{cx+1}}$$

Result(type 8, 16 leaves):

$$\int (dx)^m (a+b\operatorname{arccosh}(cx))\,dx$$

Test results for the 153 problems in "7.2.4 (f x)^m (d+e x^2)^p (a+b arccosh(c x))^n.txt"

Problem 12: Result more than twice size of optimal antiderivative.

$$\int \frac{a+b\operatorname{arccosh}(cx)}{x^3(-c^2dx^2+d)}\,dx$$

Optimal(type 4, 148 leaves, 9 steps):

$$\frac{-a-b\operatorname{arccosh}(cx)}{2dx^2}+\frac{2c^2(a+b\operatorname{arccosh}(cx))\operatorname{arctanh}\left(\left(cx+\sqrt{cx-1}\sqrt{cx+1}\right)^2\right)}{d}+\frac{bc^2\operatorname{polylog}\left(2,-\left(cx+\sqrt{cx-1}\sqrt{cx+1}\right)^2\right)}{2d}$$
$$-\frac{bc^2\operatorname{polylog}\left(2,\left(cx+\sqrt{cx-1}\sqrt{cx+1}\right)^2\right)}{2d}+\frac{bc\sqrt{cx-1}\sqrt{cx+1}}{2dx}$$

Result(type 4, 300 leaves):

$$-\frac{a}{2dx^2}+\frac{c^2a\ln(cx)}{d}-\frac{c^2a\ln(cx+1)}{2d}-\frac{c^2a\ln(cx-1)}{2d}+\frac{bc\sqrt{cx-1}\sqrt{cx+1}}{2dx}-\frac{bc^2}{2d}-\frac{b\operatorname{arccosh}(cx)}{2dx^2}$$

$$- \frac{c^2 b \operatorname{arccosh}(c x) \ln\left(1 + c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)}{d} - \frac{c^2 b \operatorname{polylog}\left(2, -c x - \sqrt{c x - 1}\, \sqrt{c x + 1}\right)}{d}$$
$$- \frac{c^2 b \operatorname{arccosh}(c x) \ln\left(1 - c x - \sqrt{c x - 1}\, \sqrt{c x + 1}\right)}{d} - \frac{c^2 b \operatorname{polylog}\left(2, c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)}{d}$$
$$+ \frac{c^2 b \operatorname{arccosh}(c x) \ln\left(1 + \left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)^2\right)}{d} + \frac{b c^2 \operatorname{polylog}\left(2, -\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)^2\right)}{2 d}$$

Problem 19: Result more than twice size of optimal antiderivative.

$$\int x^2 \left(a + b \operatorname{arccosh}(c x)\right) \sqrt{-c^2 d x^2 + d}\, dx$$

Optimal(type 3, 169 leaves, 5 steps):

$$- \frac{x \left(a + b \operatorname{arccosh}(c x)\right) \sqrt{-c^2 d x^2 + d}}{8 c^2} + \frac{x^3 \left(a + b \operatorname{arccosh}(c x)\right) \sqrt{-c^2 d x^2 + d}}{4} + \frac{b x^2 \sqrt{-c^2 d x^2 + d}}{16 c \sqrt{c x - 1}\, \sqrt{c x + 1}} - \frac{b c x^4 \sqrt{-c^2 d x^2 + d}}{16 \sqrt{c x - 1}\, \sqrt{c x + 1}}$$
$$- \frac{\left(a + b \operatorname{arccosh}(c x)\right)^2 \sqrt{-c^2 d x^2 + d}}{16 b c^3 \sqrt{c x - 1}\, \sqrt{c x + 1}}$$

Result(type 3, 345 leaves):

$$- \frac{a x \left(-c^2 d x^2 + d\right)^{3/2}}{4 c^2 d} + \frac{a x \sqrt{-c^2 d x^2 + d}}{8 c^2} + \frac{a d \arctan\left(\frac{\sqrt{c^2 d}\, x}{\sqrt{-c^2 d x^2 + d}}\right)}{8 c^2 \sqrt{c^2 d}} - \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \operatorname{arccosh}(c x)^2}{16 \sqrt{c x - 1}\, \sqrt{c x + 1}\, c^3} - \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}\, c x^4}{16 \sqrt{c x + 1}\, \sqrt{c x - 1}}$$
$$+ \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}\, x^2}{16 \sqrt{c x + 1}\, c \sqrt{c x - 1}} + \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}\, c^2 \operatorname{arccosh}(c x)\, x^5}{4 (c x + 1) (c x - 1)} - \frac{3 b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \operatorname{arccosh}(c x)\, x^3}{8 (c x + 1) (c x - 1)} + \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \operatorname{arccosh}(c x)\, x}{8 (c x + 1) c^2 (c x - 1)}$$
$$- \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}}{128 \sqrt{c x + 1}\, c^3 \sqrt{c x - 1}}$$

Problem 20: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(a + b \operatorname{arccosh}(c x)\right) \sqrt{-c^2 d x^2 + d}}{x^8}\, dx$$

Optimal(type 3, 235 leaves, 4 steps):

$$- \frac{\left(-c^2 d x^2 + d\right)^{3/2} \left(a + b \operatorname{arccosh}(c x)\right)}{7 d x^7} - \frac{4 c^2 \left(-c^2 d x^2 + d\right)^{3/2} \left(a + b \operatorname{arccosh}(c x)\right)}{35 d x^5} - \frac{8 c^4 \left(-c^2 d x^2 + d\right)^{3/2} \left(a + b \operatorname{arccosh}(c x)\right)}{105 d x^3}$$
$$- \frac{b c \sqrt{-c^2 d x^2 + d}}{42 x^6 \sqrt{c x - 1}\, \sqrt{c x + 1}} + \frac{b c^3 \sqrt{-c^2 d x^2 + d}}{140 x^4 \sqrt{c x - 1}\, \sqrt{c x + 1}} + \frac{2 b c^5 \sqrt{-c^2 d x^2 + d}}{105 x^2 \sqrt{c x - 1}\, \sqrt{c x + 1}} - \frac{8 b c^7 \ln(x) \sqrt{-c^2 d x^2 + d}}{105 \sqrt{c x - 1}\, \sqrt{c x + 1}}$$

Result(type ?, 2533 leaves): Display of huge result suppressed!

Problem 21: Result more than twice size of optimal antiderivative.

$$\int x^5 (a + b \operatorname{arccosh}(c x)) \sqrt{-c^2 d x^2 + d}\, dx$$

Optimal(type 3, 228 leaves, 3 steps):

$$-\frac{(-c^2 d x^2 + d)^{3/2} (a + b \operatorname{arccosh}(c x))}{3 c^6 d} + \frac{2 (-c^2 d x^2 + d)^{5/2} (a + b \operatorname{arccosh}(c x))}{5 c^6 d^2} - \frac{(-c^2 d x^2 + d)^{7/2} (a + b \operatorname{arccosh}(c x))}{7 c^6 d^3} + \frac{8 b x \sqrt{-c^2 d x^2 + d}}{105 c^5 \sqrt{c x - 1} \sqrt{c x + 1}} + \frac{4 b x^3 \sqrt{-c^2 d x^2 + d}}{315 c^3 \sqrt{c x - 1} \sqrt{c x + 1}} + \frac{b x^5 \sqrt{-c^2 d x^2 + d}}{175 c \sqrt{c x - 1} \sqrt{c x + 1}} - \frac{b c x^7 \sqrt{-c^2 d x^2 + d}}{49 \sqrt{c x - 1} \sqrt{c x + 1}}$$

Result(type 3, 987 leaves):

$$a \left(-\frac{x^4 (-c^2 d x^2 + d)^{3/2}}{7 c^2 d} + \frac{4 \left(-\frac{x^2 (-c^2 d x^2 + d)^{3/2}}{5 c^2 d} - \frac{2 (-c^2 d x^2 + d)^{3/2}}{15 d c^4} \right)}{7 c^2} \right) + b \left(\frac{1}{6272 (c x + 1) c^6 (c x - 1)} \left(\sqrt{-d (c^2 x^2 - 1)} \left(64 c^8 x^8 - 144 c^6 x^6 + 64 \sqrt{c x + 1} \sqrt{c x - 1} x^7 c^7 + 104 c^4 x^4 - 112 \sqrt{c x + 1} \sqrt{c x - 1} x^5 c^5 - 25 c^2 x^2 + 56 c^3 x^3 \sqrt{c x - 1} \sqrt{c x + 1} - 7 \sqrt{c x - 1} \sqrt{c x + 1} x c + 1 \right) (-1 + 7 \operatorname{arccosh}(c x)) \right) + \frac{1}{3200 (c x + 1) c^6 (c x - 1)} \left(3 \sqrt{-d (c^2 x^2 - 1)} \left(16 c^6 x^6 - 28 c^4 x^4 + 16 \sqrt{c x + 1} \sqrt{c x - 1} x^5 c^5 + 13 c^2 x^2 - 20 c^3 x^3 \sqrt{c x - 1} \sqrt{c x + 1} + 5 \sqrt{c x - 1} \sqrt{c x + 1} x c - 1 \right) (-1 + 5 \operatorname{arccosh}(c x)) \right) + \frac{\sqrt{-d (c^2 x^2 - 1)} \left(4 c^4 x^4 - 5 c^2 x^2 + 4 c^3 x^3 \sqrt{c x - 1} \sqrt{c x + 1} - 3 \sqrt{c x - 1} \sqrt{c x + 1} x c + 1 \right) (-1 + 3 \operatorname{arccosh}(c x))}{1152 (c x + 1) c^6 (c x - 1)} - \frac{5 \sqrt{-d (c^2 x^2 - 1)} \left(\sqrt{c x - 1} \sqrt{c x + 1} x c + c^2 x^2 - 1 \right) (\operatorname{arccosh}(c x) - 1)}{128 (c x + 1) c^6 (c x - 1)} - \frac{5 \sqrt{-d (c^2 x^2 - 1)} \left(-\sqrt{c x - 1} \sqrt{c x + 1} x c + c^2 x^2 - 1 \right) (\operatorname{arccosh}(c x) + 1)}{128 (c x + 1) c^6 (c x - 1)} + \frac{\sqrt{-d (c^2 x^2 - 1)} \left(-4 c^3 x^3 \sqrt{c x - 1} \sqrt{c x + 1} + 4 c^4 x^4 + 3 \sqrt{c x - 1} \sqrt{c x + 1} x c - 5 c^2 x^2 + 1 \right) (1 + 3 \operatorname{arccosh}(c x))}{1152 (c x + 1) c^6 (c x - 1)} + \frac{1}{3200 (c x + 1) c^6 (c x - 1)} \left(3 \sqrt{-d (c^2 x^2 - 1)} \left(-16 \sqrt{c x + 1} \sqrt{c x - 1} x^5 c^5 + 16 c^6 x^6 + 20 c^3 x^3 \sqrt{c x - 1} \sqrt{c x + 1} - 28 c^4 x^4 - 5 \sqrt{c x - 1} \sqrt{c x + 1} x c + 13 c^2 x^2 - 1 \right) (1 + 5 \operatorname{arccosh}(c x)) \right) + \frac{1}{6272 (c x + 1) c^6 (c x - 1)} \left(\sqrt{-d (c^2 x^2 - 1)} \left(-64 \sqrt{c x + 1} \sqrt{c x - 1} x^7 c^7 + 64 c^8 x^8 + 112 \sqrt{c x + 1} \sqrt{c x - 1} x^5 c^5 - 144 c^6 x^6 - 56 c^3 x^3 \sqrt{c x - 1} \sqrt{c x + 1} + 104 c^4 x^4 + 7 \sqrt{c x - 1} \sqrt{c x + 1} x c - 25 c^2 x^2 + 1 \right) (1 + 7 \operatorname{arccosh}(c x)) \right) \right)$$

Problem 22: Result more than twice size of optimal antiderivative.

$$\int x^3 (a + b \operatorname{arccosh}(cx)) \sqrt{-c^2 d x^2 + d}\, dx$$

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

$$-\frac{(-c^2 d x^2 + d)^{3/2} (a + b \operatorname{arccosh}(cx))}{3 c^4 d} + \frac{(-c^2 d x^2 + d)^{5/2} (a + b \operatorname{arccosh}(cx))}{5 c^4 d^2} + \frac{2 b x \sqrt{-c^2 d x^2 + d}}{15 c^3 \sqrt{cx-1} \sqrt{cx+1}} + \frac{b x^3 \sqrt{-c^2 d x^2 + d}}{45 c \sqrt{cx-1} \sqrt{cx+1}} - \frac{b c x^5 \sqrt{-c^2 d x^2 + d}}{25 \sqrt{cx-1} \sqrt{cx+1}}$$

Result(type 3, 639 leaves):

$$a \left(-\frac{x^2 (-c^2 d x^2 + d)^{3/2}}{5 c^2 d} - \frac{2 (-c^2 d x^2 + d)^{3/2}}{15 d c^4} \right) + b \left(\frac{1}{800 (cx+1) c^4 (cx-1)} \left(\sqrt{-d (c^2 x^2 - 1)} \left(16 c^6 x^6 - 28 c^4 x^4 + 16 \sqrt{cx+1} \sqrt{cx-1} x^5 c^5 + 13 c^2 x^2 - 20 c^3 x^3 \sqrt{cx-1} \sqrt{cx+1} + 5 \sqrt{cx-1} \sqrt{cx+1} x c - 1 \right) (-1 + 5 \operatorname{arccosh}(cx)) \right) + \frac{\sqrt{-d (c^2 x^2 - 1)} \left(4 c^4 x^4 - 5 c^2 x^2 + 4 c^3 x^3 \sqrt{cx-1} \sqrt{cx+1} - 3 \sqrt{cx-1} \sqrt{cx+1} x c + 1 \right) (-1 + 3 \operatorname{arccosh}(cx))}{288 (cx+1) c^4 (cx-1)} - \frac{\sqrt{-d (c^2 x^2 - 1)} \left(\sqrt{cx-1} \sqrt{cx+1} x c + c^2 x^2 - 1 \right) (\operatorname{arccosh}(cx) - 1)}{16 (cx+1) c^4 (cx-1)} - \frac{\sqrt{-d (c^2 x^2 - 1)} \left(-\sqrt{cx-1} \sqrt{cx+1} x c + c^2 x^2 - 1 \right) (\operatorname{arccosh}(cx) + 1)}{16 (cx+1) c^4 (cx-1)} + \frac{\sqrt{-d (c^2 x^2 - 1)} \left(-4 c^3 x^3 \sqrt{cx-1} \sqrt{cx+1} + 4 c^4 x^4 + 3 \sqrt{cx-1} \sqrt{cx+1} x c - 5 c^2 x^2 + 1 \right) (1 + 3 \operatorname{arccosh}(cx))}{288 (cx+1) c^4 (cx-1)} + \frac{1}{800 (cx+1) c^4 (cx-1)} \left(\sqrt{-d (c^2 x^2 - 1)} \left(-16 \sqrt{cx+1} \sqrt{cx-1} x^5 c^5 + 16 c^6 x^6 + 20 c^3 x^3 \sqrt{cx-1} \sqrt{cx+1} - 28 c^4 x^4 - 5 \sqrt{cx-1} \sqrt{cx+1} x c + 13 c^2 x^2 - 1 \right) (1 + 5 \operatorname{arccosh}(cx)) \right) \right)$$

Problem 24: Result more than twice size of optimal antiderivative.

$$\int x^7 (-c^2 d x^2 + d)^{3/2} (a + b \operatorname{arccosh}(cx))\, dx$$

Optimal(type 3, 335 leaves, 4 steps):

$$-\frac{(-c^2 d x^2 + d)^{5/2} (a + b \operatorname{arccosh}(cx))}{5 c^8 d} + \frac{3 (-c^2 d x^2 + d)^{7/2} (a + b \operatorname{arccosh}(cx))}{7 c^8 d^2} - \frac{(-c^2 d x^2 + d)^{9/2} (a + b \operatorname{arccosh}(cx))}{3 c^8 d^3}$$

$$+\frac{(-c^2 d x^2+d)^{11/2}(a+b\operatorname{arccosh}(cx))}{11 c^8 d^4}+\frac{16 b d x\sqrt{-c^2 d x^2+d}}{1155 c^7\sqrt{cx-1}\sqrt{cx+1}}+\frac{8 b d x^3\sqrt{-c^2 d x^2+d}}{3465 c^5\sqrt{cx-1}\sqrt{cx+1}}+\frac{2 b d x^5\sqrt{-c^2 d x^2+d}}{1925 c^3\sqrt{cx-1}\sqrt{cx+1}}$$

$$+\frac{b d x^7\sqrt{-c^2 d x^2+d}}{1617 c\sqrt{cx-1}\sqrt{cx+1}}-\frac{4 b c d x^9\sqrt{-c^2 d x^2+d}}{297\sqrt{cx-1}\sqrt{cx+1}}+\frac{b c^3 d x^{11}\sqrt{-c^2 d x^2+d}}{121\sqrt{cx-1}\sqrt{cx+1}}$$

```
Result(type 3, 1845 leaves):
```

$$a\left(-\frac{x^6(-c^2 d x^2+d)^{5/2}}{11 c^2 d}+\frac{6\left(-\frac{x^4(-c^2 d x^2+d)^{5/2}}{9 c^2 d}+\frac{4\left(-\frac{x^2(-c^2 d x^2+d)^{5/2}}{7 c^2 d}-\frac{2(-c^2 d x^2+d)^{5/2}}{35 d c^4}\right)}{9 c^2}\right)}{11 c^2}\right)+b\Bigg($$

$$-\frac{1}{247808(cx+1)c^8(cx-1)}\Big(\sqrt{-d(c^2x^2-1)}\,\big(1-61c^2x^2-2352c^6x^6+620c^4x^4+4096c^8x^8+1024x^{12}c^{12}-3328x^{10}c^{10}$$

$$+1024\sqrt{cx+1}\sqrt{cx-1}\,x^{11}c^{11}-2816\sqrt{cx+1}\sqrt{cx-1}\,x^9c^9+2816\sqrt{cx+1}\sqrt{cx-1}\,x^7c^7-1232\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5$$

$$+220c^3x^3\sqrt{cx-1}\sqrt{cx+1}-11\sqrt{cx-1}\sqrt{cx+1}\,xc\big)(-1+11\operatorname{arccosh}(cx))\,d\Big)-\frac{1}{55296(cx+1)c^8(cx-1)}\Big(\sqrt{-d(c^2x^2-1)}\,\big(256x^{10}c^{10}$$

$$-704c^8x^8+256\sqrt{cx+1}\sqrt{cx-1}\,x^9c^9+688c^6x^6-576\sqrt{cx+1}\sqrt{cx-1}\,x^7c^7-280c^4x^4+432\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5+41c^2x^2$$

$$-120c^3x^3\sqrt{cx-1}\sqrt{cx+1}+9\sqrt{cx-1}\sqrt{cx+1}\,xc-1\big)(-1+9\operatorname{arccosh}(cx))\,d\Big)+\frac{1}{100352(cx+1)c^8(cx-1)}\Big(\sqrt{-d(c^2x^2-1)}\,\big(64c^8x^8$$

$$-144c^6x^6+64\sqrt{cx+1}\sqrt{cx-1}\,x^7c^7+104c^4x^4-112\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5-25c^2x^2+56c^3x^3\sqrt{cx-1}\sqrt{cx+1}-7\sqrt{cx-1}\sqrt{cx+1}\,xc+1\big)$$

$$(-1+7\operatorname{arccosh}(cx))\,d\Big)+\frac{1}{51200(cx+1)c^8(cx-1)}\Big(11\sqrt{-d(c^2x^2-1)}\,\big(16c^6x^6-28c^4x^4+16\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5+13c^2x^2$$

$$-20c^3x^3\sqrt{cx-1}\sqrt{cx+1}+5\sqrt{cx-1}\sqrt{cx+1}\,xc-1\big)(-1+5\operatorname{arccosh}(cx))\,d\Big)$$

$$+\frac{\sqrt{-d(c^2x^2-1)}\,\big(4c^4x^4-5c^2x^2+4c^3x^3\sqrt{cx-1}\sqrt{cx+1}-3\sqrt{cx-1}\sqrt{cx+1}\,xc+1\big)(-1+3\operatorname{arccosh}(cx))\,d}{3072(cx+1)c^8(cx-1)}$$

$$-\frac{7\sqrt{-d(c^2x^2-1)}\,\big(\sqrt{cx-1}\sqrt{cx+1}\,xc+c^2x^2-1\big)(\operatorname{arccosh}(cx)-1)\,d}{1024(cx+1)c^8(cx-1)}$$

$$-\frac{7\sqrt{-d(c^2x^2-1)}\,\big(-\sqrt{cx-1}\sqrt{cx+1}\,xc+c^2x^2-1\big)(\operatorname{arccosh}(cx)+1)\,d}{1024(cx+1)c^8(cx-1)}$$

$$+\frac{\sqrt{-d\left(c^2x^2-1\right)}\left(-4c^3x^3\sqrt{cx-1}\sqrt{cx+1}+4c^4x^4+3\sqrt{cx-1}\sqrt{cx+1}\,xc-5c^2x^2+1\right)\left(1+3\operatorname{arccosh}(cx)\right)d}{3072\,(cx+1)\,c^8\,(cx-1)}$$

$$+\frac{1}{51200\,(cx+1)\,c^8\,(cx-1)}\Big(11\sqrt{-d\left(c^2x^2-1\right)}\left(-16\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5+16c^6x^6+20c^3x^3\sqrt{cx-1}\sqrt{cx+1}-28c^4x^4\right.$$
$$\left.-5\sqrt{cx-1}\sqrt{cx+1}\,xc+13c^2x^2-1\right)\left(1+5\operatorname{arccosh}(cx)\right)d\Big)+\frac{1}{100352\,(cx+1)\,c^8\,(cx-1)}\Big(\sqrt{-d\left(c^2x^2-1\right)}\left(-64\sqrt{cx+1}\sqrt{cx-1}\,x^7c^7\right.$$
$$\left.+64c^8x^8+112\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5-144c^6x^6-56c^3x^3\sqrt{cx-1}\sqrt{cx+1}+104c^4x^4+7\sqrt{cx-1}\sqrt{cx+1}\,xc-25c^2x^2+1\right)(1$$
$$+7\operatorname{arccosh}(cx))\,d\Big)-\frac{1}{55296\,(cx+1)\,c^8\,(cx-1)}\Big(\sqrt{-d\left(c^2x^2-1\right)}\left(-256\sqrt{cx+1}\sqrt{cx-1}\,x^9c^9+256x^{10}c^{10}+576\sqrt{cx+1}\sqrt{cx-1}\,x^7c^7\right.$$
$$\left.-704c^8x^8-432\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5+688c^6x^6+120c^3x^3\sqrt{cx-1}\sqrt{cx+1}-280c^4x^4-9\sqrt{cx-1}\sqrt{cx+1}\,xc+41c^2x^2-1\right)(1$$
$$+9\operatorname{arccosh}(cx))\,d\Big)-\frac{1}{247808\,(cx+1)\,c^8\,(cx-1)}\Big(\sqrt{-d\left(c^2x^2-1\right)}\left(-1024\sqrt{cx+1}\sqrt{cx-1}\,x^{11}c^{11}+1024x^{12}c^{12}\right.$$
$$+2816\sqrt{cx+1}\sqrt{cx-1}\,x^9c^9-3328x^{10}c^{10}-2816\sqrt{cx+1}\sqrt{cx-1}\,x^7c^7+4096c^8x^8+1232\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5-2352c^6x^6$$
$$\left.-220c^3x^3\sqrt{cx-1}\sqrt{cx+1}+620c^4x^4+11\sqrt{cx-1}\sqrt{cx+1}\,xc-61c^2x^2+1\right)\left(1+11\operatorname{arccosh}(cx)\right)d\Big)\Big)$$

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Problem 25: Result more than twice size of optimal antiderivative.
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$$\int x^5\left(-c^2dx^2+d\right)^{3/2}\left(a+b\operatorname{arccosh}(cx)\right)dx$$

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Optimal(type 3, 269 leaves, 4 steps):
```

$$-\frac{\left(-c^2dx^2+d\right)^{5/2}\left(a+b\operatorname{arccosh}(cx)\right)}{5c^6d}+\frac{2\left(-c^2dx^2+d\right)^{7/2}\left(a+b\operatorname{arccosh}(cx)\right)}{7c^6d^2}-\frac{\left(-c^2dx^2+d\right)^{9/2}\left(a+b\operatorname{arccosh}(cx)\right)}{9c^6d^3}$$
$$+\frac{8bdx\sqrt{-c^2dx^2+d}}{315c^5\sqrt{cx-1}\sqrt{cx+1}}+\frac{4bdx^3\sqrt{-c^2dx^2+d}}{945c^3\sqrt{cx-1}\sqrt{cx+1}}+\frac{bdx^5\sqrt{-c^2dx^2+d}}{525c\sqrt{cx-1}\sqrt{cx+1}}-\frac{10bcdx^7\sqrt{-c^2dx^2+d}}{441\sqrt{cx-1}\sqrt{cx+1}}+\frac{bc^3dx^9\sqrt{-c^2dx^2+d}}{81\sqrt{cx-1}\sqrt{cx+1}}$$

```
Result(type 3, 1375 leaves):
```

$$a\left(-\frac{x^4\left(-c^2dx^2+d\right)^{5/2}}{9c^2d}+\frac{4\left(-\frac{x^2\left(-c^2dx^2+d\right)^{5/2}}{7c^2d}-\frac{2\left(-c^2dx^2+d\right)^{5/2}}{35dc^4}\right)}{9c^2}\right)+b\Bigg(-\frac{1}{41472\,(cx+1)\,c^6\,(cx-1)}\Big(\sqrt{-d\left(c^2x^2-1\right)}\left(256x^{10}c^{10}\right.$$
$$-704c^8x^8+256\sqrt{cx+1}\sqrt{cx-1}\,x^9c^9+688c^6x^6-576\sqrt{cx+1}\sqrt{cx-1}\,x^7c^7-280c^4x^4+432\sqrt{cx+1}\sqrt{cx-1}\,x^5c^5+41c^2x^2$$
$$\left.-120c^3x^3\sqrt{cx-1}\sqrt{cx+1}+9\sqrt{cx-1}\sqrt{cx+1}\,xc-1\right)\left(-1+9\operatorname{arccosh}(cx)\right)d\Big)-\frac{1}{25088\,(cx+1)\,c^6\,(cx-1)}\Big(\sqrt{-d\left(c^2x^2-1\right)}\left(64c^8x^8\right.$$

$$- 144 c^6 x^6 + 64 \sqrt{cx+1}\,\sqrt{cx-1}\, x^7 c^7 + 104 c^4 x^4 - 112 \sqrt{cx+1}\,\sqrt{cx-1}\, x^5 c^5 - 25 c^2 x^2 + 56 c^3 x^3 \sqrt{cx-1}\,\sqrt{cx+1} - 7 \sqrt{cx-1}\,\sqrt{cx+1}\, x c + 1\Big)$$

$$(-1 + 7 \operatorname{arccosh}(cx))\, d\Big) + \frac{1}{3200\,(cx+1)\,c^6\,(cx-1)} \Big(\sqrt{-d\,(c^2x^2-1)}\,\Big(16 c^6 x^6 - 28 c^4 x^4 + 16 \sqrt{cx+1}\,\sqrt{cx-1}\, x^5 c^5 + 13 c^2 x^2$$

$$- 20 c^3 x^3 \sqrt{cx-1}\,\sqrt{cx+1} + 5 \sqrt{cx-1}\,\sqrt{cx+1}\, x c - 1\Big)\,(-1 + 5 \operatorname{arccosh}(cx))\, d\Big)$$

$$+ \frac{\sqrt{-d\,(c^2x^2-1)}\,\Big(4 c^4 x^4 - 5 c^2 x^2 + 4 c^3 x^3 \sqrt{cx-1}\,\sqrt{cx+1} - 3 \sqrt{cx-1}\,\sqrt{cx+1}\, x c + 1\Big)\,(-1 + 3 \operatorname{arccosh}(cx))\, d}{1152\,(cx+1)\,c^6\,(cx-1)}$$

$$- \frac{3 \sqrt{-d\,(c^2x^2-1)}\,\Big(\sqrt{cx-1}\,\sqrt{cx+1}\, x c + c^2 x^2 - 1\Big)\,(\operatorname{arccosh}(cx) - 1)\, d}{256\,(cx+1)\,c^6\,(cx-1)}$$

$$- \frac{3 \sqrt{-d\,(c^2x^2-1)}\,\Big(-\sqrt{cx-1}\,\sqrt{cx+1}\, x c + c^2 x^2 - 1\Big)\,(\operatorname{arccosh}(cx) + 1)\, d}{256\,(cx+1)\,c^6\,(cx-1)}$$

$$+ \frac{\sqrt{-d\,(c^2x^2-1)}\,\Big(-4 c^3 x^3 \sqrt{cx-1}\,\sqrt{cx+1} + 4 c^4 x^4 + 3 \sqrt{cx-1}\,\sqrt{cx+1}\, x c - 5 c^2 x^2 + 1\Big)\,(1 + 3 \operatorname{arccosh}(cx))\, d}{1152\,(cx+1)\,c^6\,(cx-1)}$$

$$+ \frac{1}{3200\,(cx+1)\,c^6\,(cx-1)} \Big(\sqrt{-d\,(c^2x^2-1)}\,\Big(-16 \sqrt{cx+1}\,\sqrt{cx-1}\, x^5 c^5 + 16 c^6 x^6 + 20 c^3 x^3 \sqrt{cx-1}\,\sqrt{cx+1} - 28 c^4 x^4 - 5 \sqrt{cx-1}\,\sqrt{cx+1}\, x c$$

$$+ 13 c^2 x^2 - 1\Big)\,(1 + 5 \operatorname{arccosh}(cx))\, d\Big) - \frac{1}{25088\,(cx+1)\,c^6\,(cx-1)} \Big(\sqrt{-d\,(c^2x^2-1)}\,\Big(-64 \sqrt{cx+1}\,\sqrt{cx-1}\, x^7 c^7 + 64 c^8 x^8$$

$$+ 112 \sqrt{cx+1}\,\sqrt{cx-1}\, x^5 c^5 - 144 c^6 x^6 - 56 c^3 x^3 \sqrt{cx-1}\,\sqrt{cx+1} + 104 c^4 x^4 + 7 \sqrt{cx-1}\,\sqrt{cx+1}\, x c - 25 c^2 x^2 + 1\Big)\,(1 + 7 \operatorname{arccosh}(cx))\, d\Big)$$

$$- \frac{1}{41472\,(cx+1)\,c^6\,(cx-1)} \Big(\sqrt{-d\,(c^2x^2-1)}\,\Big(-256 \sqrt{cx+1}\,\sqrt{cx-1}\, x^9 c^9 + 256 x^{10} c^{10} + 576 \sqrt{cx+1}\,\sqrt{cx-1}\, x^7 c^7 - 704 c^8 x^8$$

$$- 432 \sqrt{cx+1}\,\sqrt{cx-1}\, x^5 c^5 + 688 c^6 x^6 + 120 c^3 x^3 \sqrt{cx-1}\,\sqrt{cx+1} - 280 c^4 x^4 - 9 \sqrt{cx-1}\,\sqrt{cx+1}\, x c + 41 c^2 x^2 - 1\Big)\,(1 + 9 \operatorname{arccosh}(cx))\, d\Big)\Bigg)$$

Problem 26: Result more than twice size of optimal antiderivative.

$$\int \frac{(-c^2 d x^2 + d)^{5/2}\,(a + b \operatorname{arccosh}(cx))}{x^4}\, dx$$

Optimal(type 3, 249 leaves, 12 steps):

$$\frac{5 c^2 d\,(-c^2 d x^2 + d)^{3/2}\,(a + b \operatorname{arccosh}(cx))}{3 x} - \frac{(-c^2 d x^2 + d)^{5/2}\,(a + b \operatorname{arccosh}(cx))}{3 x^3} + \frac{5 c^4 d^2 x\,(a + b \operatorname{arccosh}(cx))\,\sqrt{-c^2 d x^2 + d}}{2}$$

$$-\frac{b c d^2 \sqrt{-c^2 d x^2+d}}{6 x^2 \sqrt{c x-1}\,\sqrt{c x+1}}-\frac{b c^5 d^2 x^2 \sqrt{-c^2 d x^2+d}}{4 \sqrt{c x-1}\,\sqrt{c x+1}}-\frac{5 c^3 d^2 (a+b \operatorname{arccosh}(c x))^2 \sqrt{-c^2 d x^2+d}}{4 b \sqrt{c x-1}\,\sqrt{c x+1}}-\frac{7 b c^3 d^2 \ln(x) \sqrt{-c^2 d x^2+d}}{3 \sqrt{c x-1}\,\sqrt{c x+1}}$$

Result(type 3, 1406 leaves):

$$\frac{4 a c^2 (-c^2 d x^2+d)^{7/2}}{3 d x}-\frac{21 b \sqrt{-d (c^2 x^2-1)}\, d^2 x^2 c^5}{2 (63 c^4 x^4-15 c^2 x^2+1) \sqrt{c x-1}\,\sqrt{c x+1}}+\frac{5 a c^4 (-c^2 d x^2+d)^{3/2} x d}{3}+\frac{5 a c^4 d^2 x \sqrt{-c^2 d x^2+d}}{2}$$

$$+\frac{5 a c^4 d^3 \arctan\left(\frac{\sqrt{c^2 d}\, x}{\sqrt{-c^2 d x^2+d}}\right)}{2 \sqrt{c^2 d}}+\frac{b \sqrt{-d (c^2 x^2-1)}\, c^6 d^2 \operatorname{arccosh}(c x) x^3}{2 (c x-1) (c x+1)}-\frac{b \sqrt{-d (c^2 x^2-1)}\, c^4 d^2 \operatorname{arccosh}(c x) x}{2 (c x-1) (c x+1)}$$

$$+\frac{49 b \sqrt{-d (c^2 x^2-1)}\, d^2 x^5 c^8}{6 (63 c^4 x^4-15 c^2 x^2+1) (c x-1) (c x+1)}-\frac{28 b \sqrt{-d (c^2 x^2-1)}\, d^2 x^3 c^6}{3 (63 c^4 x^4-15 c^2 x^2+1) (c x-1) (c x+1)}+\frac{7 b \sqrt{-d (c^2 x^2-1)}\, d^2 x c^4}{6 (63 c^4 x^4-15 c^2 x^2+1) (c x-1) (c x+1)}$$

$$+\frac{b \sqrt{-d (c^2 x^2-1)}\, d^2 \operatorname{arccosh}(c x)}{3 (63 c^4 x^4-15 c^2 x^2+1) (c x-1) x^3 (c x+1)}-\frac{b \sqrt{-d (c^2 x^2-1)}\, d^2 c}{6 (63 c^4 x^4-15 c^2 x^2+1) \sqrt{c x-1}\, x^2 \sqrt{c x+1}}-\frac{7 b \sqrt{-d (c^2 x^2-1)}\, d^2 \operatorname{arccosh}(c x) c^3}{3 (63 c^4 x^4-15 c^2 x^2+1) \sqrt{c x-1}\,\sqrt{c x+1}}$$

$$-\frac{23 b \sqrt{-d (c^2 x^2-1)}\, d^2 \operatorname{arccosh}(c x) c^2}{3 (63 c^4 x^4-15 c^2 x^2+1) (c x-1) x (c x+1)}+\frac{147 b \sqrt{-d (c^2 x^2-1)}\, d^2 x^5 \operatorname{arccosh}(c x) c^8}{(63 c^4 x^4-15 c^2 x^2+1) (c x-1) (c x+1)}-\frac{203 b \sqrt{-d (c^2 x^2-1)}\, d^2 x^3 \operatorname{arccosh}(c x) c^6}{(63 c^4 x^4-15 c^2 x^2+1) (c x-1) (c x+1)}$$

$$+\frac{190 b \sqrt{-d (c^2 x^2-1)}\, d^2 x \operatorname{arccosh}(c x) c^4}{3 (63 c^4 x^4-15 c^2 x^2+1) (c x-1) (c x+1)}+\frac{35 b \sqrt{-d (c^2 x^2-1)}\, d^2 x^2 \operatorname{arccosh}(c x) c^5}{(63 c^4 x^4-15 c^2 x^2+1) \sqrt{c x-1}\,\sqrt{c x+1}}-\frac{147 b \sqrt{-d (c^2 x^2-1)}\, d^2 x^4 \operatorname{arccosh}(c x) c^7}{(63 c^4 x^4-15 c^2 x^2+1) \sqrt{c x-1}\,\sqrt{c x+1}}$$

$$-\frac{7 b \sqrt{-d (c^2 x^2-1)}\, \ln\left(1+\left(c x+\sqrt{c x-1}\,\sqrt{c x+1}\right)^2\right) c^3 d^2}{3 \sqrt{c x-1}\,\sqrt{c x+1}}+\frac{14 b \sqrt{-d (c^2 x^2-1)}\, \operatorname{arccosh}(c x) c^3 d^2}{3 \sqrt{c x-1}\,\sqrt{c x+1}}-\frac{5 b \sqrt{-d (c^2 x^2-1)}\, \operatorname{arccosh}(c x)^2 c^3 d^2}{4 \sqrt{c x-1}\,\sqrt{c x+1}}$$

$$-\frac{b \sqrt{-d (c^2 x^2-1)}\, c^5 d^2 x^2}{4 \sqrt{c x-1}\,\sqrt{c x+1}}+\frac{5 b \sqrt{-d (c^2 x^2-1)}\, d^2 c^3}{2 (63 c^4 x^4-15 c^2 x^2+1) \sqrt{c x-1}\,\sqrt{c x+1}}-\frac{49 b \sqrt{-d (c^2 x^2-1)}\, d^2 x^3 c^6}{6 (63 c^4 x^4-15 c^2 x^2+1)}+\frac{7 b \sqrt{-d (c^2 x^2-1)}\, d^2 x c^4}{6 (63 c^4 x^4-15 c^2 x^2+1)}$$

$$+\frac{b \sqrt{-d (c^2 x^2-1)}\, c^3 d^2}{8 \sqrt{c x-1}\,\sqrt{c x+1}}-\frac{a (-c^2 d x^2+d)^{7/2}}{3 d x^3}+\frac{4 a c^4 x (-c^2 d x^2+d)^{5/2}}{3}$$

Problem 27: Result more than twice size of optimal antiderivative.

$$\int \frac{(-c^2 d x^2+d)^{5/2} (a+b \operatorname{arccosh}(c x))}{x^6}\, dx$$

Optimal(type 3, 251 leaves, 12 steps):

$$\frac{c^2 d (-c^2 d x^2+d)^{3/2} (a+b \operatorname{arccosh}(c x))}{3 x^3}-\frac{(-c^2 d x^2+d)^{5/2} (a+b \operatorname{arccosh}(c x))}{5 x^5}-\frac{c^4 d^2 (a+b \operatorname{arccosh}(c x)) \sqrt{-c^2 d x^2+d}}{x}$$

$$-\frac{b c d^2 \sqrt{-c^2 d x^2+d}}{20 x^4 \sqrt{c x-1}\, \sqrt{c x+1}}+\frac{11 b c^3 d^2 \sqrt{-c^2 d x^2+d}}{30 x^2 \sqrt{c x-1}\, \sqrt{c x+1}}+\frac{c^5 d^2 \left(a+b \operatorname{arccosh}(c x)\right)^2 \sqrt{-c^2 d x^2+d}}{2 b \sqrt{c x-1}\, \sqrt{c x+1}}+\frac{23 b c^5 d^2 \ln(x) \sqrt{-c^2 d x^2+d}}{15 \sqrt{c x-1}\, \sqrt{c x+1}}$$

Result(type ?, 2428 leaves): Display of huge result suppressed!

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

$$\int \frac{a+b \operatorname{arccosh}(c x)}{x^4 \sqrt{-c^2 d x^2+d}}\, dx$$

Optimal(type 3, 131 leaves, 4 steps):

$$\frac{b c \sqrt{c x-1}\, \sqrt{c x+1}}{6 x^2 \sqrt{-c^2 d x^2+d}}-\frac{2 b c^3 \ln(x) \sqrt{c x-1}\, \sqrt{c x+1}}{3 \sqrt{-c^2 d x^2+d}}-\frac{\left(a+b \operatorname{arccosh}(c x)\right) \sqrt{-c^2 d x^2+d}}{3 d x^3}-\frac{2 c^2 \left(a+b \operatorname{arccosh}(c x)\right) \sqrt{-c^2 d x^2+d}}{3 d x}$$

Result(type 3, 853 leaves):

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

$$+\frac{2 b \sqrt{-d \left(c^2 x^2-1\right)}\, x^5 c^8}{3 d \left(3 c^4 x^4-2 c^2 x^2-1\right)}+\frac{2 b \sqrt{-d \left(c^2 x^2-1\right)}\, x^2 \operatorname{arccosh}(c x) \sqrt{c x-1}\, \sqrt{c x+1}\, c^5}{d \left(3 c^4 x^4-2 c^2 x^2-1\right)}-\frac{2 b \sqrt{-d \left(c^2 x^2-1\right)}\, x^3 \operatorname{arccosh}(c x) c^6}{d \left(3 c^4 x^4-2 c^2 x^2-1\right)}$$

$$-\frac{b \sqrt{-d \left(c^2 x^2-1\right)}\, x (c x-1) (c x+1) c^4}{3 d \left(3 c^4 x^4-2 c^2 x^2-1\right)}-\frac{b \sqrt{-d \left(c^2 x^2-1\right)}\, x^3 c^6}{3 d \left(3 c^4 x^4-2 c^2 x^2-1\right)}+\frac{2 b \sqrt{-d \left(c^2 x^2-1\right)} \operatorname{arccosh}(c x) \sqrt{c x-1}\, \sqrt{c x+1}\, c^3}{3 d \left(3 c^4 x^4-2 c^2 x^2-1\right)}$$

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

$$-\frac{b \sqrt{-d \left(c^2 x^2-1\right)}\, \sqrt{c x-1}\, \sqrt{c x+1}\, c}{6 d \left(3 c^4 x^4-2 c^2 x^2-1\right) x^2}+\frac{b \sqrt{-d \left(c^2 x^2-1\right)} \operatorname{arccosh}(c x)}{3 d \left(3 c^4 x^4-2 c^2 x^2-1\right) x^3}$$

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

Problem 32: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2 \left(a+b \operatorname{arccosh}(c x)\right)}{\left(-c^2 d x^2+d\right)^{3/2}}\, dx$$

Optimal(type 3, 125 leaves, 4 steps):

$$\frac{x \left(a+b \operatorname{arccosh}(c x)\right)}{c^2 d \sqrt{-c^2 d x^2+d}}-\frac{\left(a+b \operatorname{arccosh}(c x)\right)^2 \sqrt{c x-1}\, \sqrt{c x+1}}{2 b c^3 d \sqrt{-c^2 d x^2+d}}-\frac{b \ln\left(-c^2 x^2+1\right) \sqrt{c x-1}\, \sqrt{c x+1}}{2 c^3 d \sqrt{-c^2 d x^2+d}}$$

Result(type 3, 278 leaves):

$$\frac{a x}{c^{2} d \sqrt{-c^{2} d x^{2}+d}}-\frac{a \arctan\left(\frac{\sqrt{c^{2} d}\, x}{\sqrt{-c^{2} d x^{2}+d}}\right)}{c^{2} d \sqrt{c^{2} d}}+\frac{b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\, \sqrt{c x+1}\, \operatorname{arccosh}(c x)^{2}}{2 d^{2} c^{3}\left(c^{2} x^{2}-1\right)}$$
$$-\frac{b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\, \sqrt{c x+1}\, \operatorname{arccosh}(c x)}{d^{2} c^{3}\left(c^{2} x^{2}-1\right)}-\frac{b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x)\, x}{d^{2} c^{2}\left(c^{2} x^{2}-1\right)}$$
$$+\frac{b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\, \sqrt{c x+1}\, \ln\left(\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right)^{2}-1\right)}{d^{2} c^{3}\left(c^{2} x^{2}-1\right)}$$

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

$$\int \frac{x\left(a+b \operatorname{arccosh}(c x)\right)}{\left(-c^{2} d x^{2}+d\right)^{3/2}}\, dx$$

Optimal(type 3, 68 leaves, 3 steps):

$$\frac{a+b \operatorname{arccosh}(c x)}{c^{2} d \sqrt{-c^{2} d x^{2}+d}}+\frac{b \operatorname{arctanh}(c x)\, \sqrt{c x-1}\, \sqrt{c x+1}}{c^{2} d \sqrt{-c^{2} d x^{2}+d}}$$

Result(type 3, 197 leaves):

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

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

$$\int \frac{a+b \operatorname{arccosh}(c x)}{\left(-c^{2} d x^{2}+d\right)^{3/2}}\, dx$$

Optimal(type 3, 74 leaves, 2 steps):

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

Result(type 3, 179 leaves):

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

Problem 35: Result more than twice size of optimal antiderivative.

$$\int \frac{a + b \operatorname{arccosh}(c x)}{x \left(-c^2 d x^2 + d\right)^{3/2}} \, dx$$

Optimal(type 4, 238 leaves, 9 steps):

$$\frac{a + b \operatorname{arccosh}(c x)}{d \sqrt{-c^2 d x^2 + d}} + \frac{2 \left(a + b \operatorname{arccosh}(c x)\right) \arctan\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right) \sqrt{c x - 1}\, \sqrt{c x + 1}}{d \sqrt{-c^2 d x^2 + d}} + \frac{b \operatorname{arctanh}(c x) \sqrt{c x - 1}\, \sqrt{c x + 1}}{d \sqrt{-c^2 d x^2 + d}} - \frac{I b \operatorname{polylog}\left(2, -I \left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)\right) \sqrt{c x - 1}\, \sqrt{c x + 1}}{d \sqrt{-c^2 d x^2 + d}} + \frac{I b \operatorname{polylog}\left(2, I \left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)\right) \sqrt{c x - 1}\, \sqrt{c x + 1}}{d \sqrt{-c^2 d x^2 + d}}$$

Result(type 4, 510 leaves):

$$\frac{a}{d \sqrt{-c^2 d x^2 + d}} - \frac{a \ln\left(\frac{2 d + 2 \sqrt{d}\, \sqrt{-c^2 d x^2 + d}}{x}\right)}{d^{3/2}} - \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \operatorname{arccosh}(c x)}{\left(c^2 x^2 - 1\right) d^2} - \frac{I b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \sqrt{c x - 1}\, \sqrt{c x + 1}\, \operatorname{dilog}\left(1 - I \left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)\right)}{\left(c^2 x^2 - 1\right) d^2} + \frac{I b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \sqrt{c x - 1}\, \sqrt{c x + 1}\, \operatorname{dilog}\left(1 + I \left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)\right)}{\left(c^2 x^2 - 1\right) d^2} + \frac{I b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \sqrt{c x - 1}\, \sqrt{c x + 1}\, \operatorname{arccosh}(c x) \ln\left(1 + I \left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)\right)}{\left(c^2 x^2 - 1\right) d^2} - \frac{I b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \sqrt{c x - 1}\, \sqrt{c x + 1}\, \operatorname{arccosh}(c x) \ln\left(1 - I \left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)\right)}{\left(c^2 x^2 - 1\right) d^2} - \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \sqrt{c x - 1}\, \sqrt{c x + 1}\, \ln\left(1 + c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)}{\left(c^2 x^2 - 1\right) d^2} + \frac{b \sqrt{-d \left(c^2 x^2 - 1\right)}\, \sqrt{c x - 1}\, \sqrt{c x + 1}\, \ln\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1} - 1\right)}{\left(c^2 x^2 - 1\right) d^2}$$

Problem 36: Result more than twice size of optimal antiderivative.

$$\int \frac{a + b \operatorname{arccosh}(c x)}{x^3 \left(-c^2 d x^2 + d\right)^{3/2}} \, dx$$

Optimal(type 4, 323 leaves, 13 steps):

$$\frac{3 c^2 \left(a + b \operatorname{arccosh}(c x)\right)}{2 d \sqrt{-c^2 d x^2 + d}} + \frac{-a - b \operatorname{arccosh}(c x)}{2 d x^2 \sqrt{-c^2 d x^2 + d}} + \frac{b c \sqrt{c x - 1}\, \sqrt{c x + 1}}{2 d x \sqrt{-c^2 d x^2 + d}} + \frac{3 c^2 \left(a + b \operatorname{arccosh}(c x)\right) \arctan\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right) \sqrt{c x - 1}\, \sqrt{c x + 1}}{d \sqrt{-c^2 d x^2 + d}} + \frac{b c^2 \operatorname{arctanh}(c x) \sqrt{c x - 1}\, \sqrt{c x + 1}}{d \sqrt{-c^2 d x^2 + d}} - \frac{3 I b c^2 \operatorname{polylog}\left(2, -I \left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right)\right) \sqrt{c x - 1}\, \sqrt{c x + 1}}{2 d \sqrt{-c^2 d x^2 + d}}$$

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

Result(type 4, 647 leaves):

$$-\frac{a}{2 d x^2 \sqrt{-c^2 d x^2+d}}+\frac{3 a c^2}{2 d \sqrt{-c^2 d x^2+d}}-\frac{3 a c^2 \ln\left(\frac{2 d+2 \sqrt{d} \sqrt{-c^2 d x^2+d}}{x}\right)}{2 d^{3/2}}-\frac{3 b \sqrt{-d\left(c^2 x^2-1\right)} \operatorname{arccosh}(c x) c^2}{2 d^2\left(c^2 x^2-1\right)}$$

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

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

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

$$-\frac{3 I b \sqrt{-d\left(c^2 x^2-1\right)} \sqrt{c x-1} \sqrt{c x+1} \operatorname{dilog}\left(1-I\left(c x+\sqrt{c x-1} \sqrt{c x+1}\right)\right) c^2}{2\left(c^2 x^2-1\right) d^2}$$

$$+\frac{3 I b \sqrt{-d\left(c^2 x^2-1\right)} \sqrt{c x-1} \sqrt{c x+1} \operatorname{dilog}\left(1+I\left(c x+\sqrt{c x-1} \sqrt{c x+1}\right)\right) c^2}{2\left(c^2 x^2-1\right) d^2}$$

$$+\frac{3 I b \sqrt{-d\left(c^2 x^2-1\right)} \sqrt{c x-1} \sqrt{c x+1} \operatorname{arccosh}(c x) \ln\left(1+I\left(c x+\sqrt{c x-1} \sqrt{c x+1}\right)\right) c^2}{2\left(c^2 x^2-1\right) d^2}$$

$$-\frac{3 I b \sqrt{-d\left(c^2 x^2-1\right)} \sqrt{c x-1} \sqrt{c x+1} \operatorname{arccosh}(c x) \ln\left(1-I\left(c x+\sqrt{c x-1} \sqrt{c x+1}\right)\right) c^2}{2\left(c^2 x^2-1\right) d^2}$$

Problem 37: Result more than twice size of optimal antiderivative.

$$\int \frac{x^5\left(a+b \operatorname{arccosh}(c x)\right)}{\left(-c^2 d x^2+d\right)^{5/2}} \, dx$$

Optimal(type 3, 213 leaves, 5 steps):

$$\frac{a+b \operatorname{arccosh}(c x)}{3 c^6 d\left(-c^2 d x^2+d\right)^{3/2}}-\frac{2\left(a+b \operatorname{arccosh}(c x)\right)}{c^6 d^2 \sqrt{-c^2 d x^2+d}}-\frac{\left(a+b \operatorname{arccosh}(c x)\right) \sqrt{-c^2 d x^2+d}}{c^6 d^3}+\frac{b x \sqrt{-c^2 d x^2+d}}{c^5 d^3 \sqrt{c x-1} \sqrt{c x+1}}$$

$$-\frac{b x \sqrt{-c^2 d x^2+d}}{6 c^5 d^3\left(-c^2 x^2+1\right) \sqrt{c x-1} \sqrt{c x+1}}+\frac{11 b \operatorname{arctanh}(c x) \sqrt{-c^2 d x^2+d}}{6 c^6 d^3 \sqrt{c x-1} \sqrt{c x+1}}$$

Result(type 3, 465 leaves):

$$-\frac{a x^4}{c^2 d\left(-c^2 d x^2+d\right)^{3/2}}+\frac{4 a x^2}{c^4 d\left(-c^2 d x^2+d\right)^{3/2}}-\frac{8 a}{3 c^6 d\left(-c^2 d x^2+d\right)^{3/2}}-\frac{b\sqrt{-d\left(c^2 x^2-1\right)}\,\operatorname{arccosh}(c x)\, x^2}{c^4 d^3\left(c^2 x^2-1\right)}$$
$$+\frac{b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{c x-1}\,\sqrt{c x+1}\, x}{c^5 d^3\left(c^2 x^2-1\right)}+\frac{b\sqrt{-d\left(c^2 x^2-1\right)}\,\operatorname{arccosh}(c x)}{c^6 d^3\left(c^2 x^2-1\right)}+\frac{2 b\sqrt{-d\left(c^2 x^2-1\right)}\,\operatorname{arccosh}(c x)\, x^2}{\left(c^2 x^2-1\right)^2 d^3 c^4}$$
$$+\frac{b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{c x-1}\,\sqrt{c x+1}\, x}{6\left(c^2 x^2-1\right)^2 d^3 c^5}-\frac{5 b\sqrt{-d\left(c^2 x^2-1\right)}\,\operatorname{arccosh}(c x)}{3\left(c^2 x^2-1\right)^2 d^3 c^6}$$
$$+\frac{11 b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{c x-1}\,\sqrt{c x+1}\,\ln\left(1+c x+\sqrt{c x-1}\,\sqrt{c x+1}\right)}{6 d^3 c^6\left(c^2 x^2-1\right)}$$
$$-\frac{11 b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{c x-1}\,\sqrt{c x+1}\,\ln\left(c x+\sqrt{c x-1}\,\sqrt{c x+1}-1\right)}{6 d^3 c^6\left(c^2 x^2-1\right)}$$

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

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

Optimal(type 3, 138 leaves, 4 steps):

$$\frac{a+b\operatorname{arccosh}(c x)}{3 c^4 d\left(-c^2 d x^2+d\right)^{3/2}}+\frac{-a-b\operatorname{arccosh}(c x)}{c^4 d^2\sqrt{-c^2 d x^2+d}}+\frac{b x\sqrt{-c^2 d x^2+d}}{6 c^3 d^3 (c x-1)^{3/2}(c x+1)^{3/2}}+\frac{5 b\operatorname{arctanh}(c x)\sqrt{-c^2 d x^2+d}}{6 c^4 d^3\sqrt{c x-1}\,\sqrt{c x+1}}$$

Result(type 3, 312 leaves):

$$\frac{a x^2}{c^2 d\left(-c^2 d x^2+d\right)^{3/2}}-\frac{2 a}{3 d c^4\left(-c^2 d x^2+d\right)^{3/2}}+\frac{b\sqrt{-d\left(c^2 x^2-1\right)}\,\operatorname{arccosh}(c x)\, x^2}{d^3\left(c^2 x^2-1\right)^2 c^2}+\frac{b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{c x-1}\,\sqrt{c x+1}\, x}{6 d^3\left(c^2 x^2-1\right)^2 c^3}$$
$$-\frac{2 b\sqrt{-d\left(c^2 x^2-1\right)}\,\operatorname{arccosh}(c x)}{3 d^3\left(c^2 x^2-1\right)^2 c^4}-\frac{5 b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{c x-1}\,\sqrt{c x+1}\,\ln\left(c x+\sqrt{c x-1}\,\sqrt{c x+1}-1\right)}{6 d^3 c^4\left(c^2 x^2-1\right)}$$
$$+\frac{5 b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{c x-1}\,\sqrt{c x+1}\,\ln\left(1+c x+\sqrt{c x-1}\,\sqrt{c x+1}\right)}{6 d^3 c^4\left(c^2 x^2-1\right)}$$

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

$$\int \frac{a+b\operatorname{arccosh}(c x)}{x^2\left(-c^2 d x^2+d\right)^{5/2}}\, dx$$

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

$$\frac{-a-b\operatorname{arccosh}(c x)}{d x\left(-c^2 d x^2+d\right)^{3/2}}+\frac{4 c^2 x\left(a+b\operatorname{arccosh}(c x)\right)}{3 d\left(-c^2 d x^2+d\right)^{3/2}}+\frac{8 c^2 x\left(a+b\operatorname{arccosh}(c x)\right)}{3 d^2\sqrt{-c^2 d x^2+d}}-\frac{b c\sqrt{-c^2 d x^2+d}}{6 d^3\left(-c^2 x^2+1\right)\sqrt{c x-1}\,\sqrt{c x+1}}+\frac{b c\ln(x)\sqrt{-c^2 d x^2+d}}{d^3\sqrt{c x-1}\,\sqrt{c x+1}}$$

$$+\frac{5 b c \ln(-c^2 x^2+1)\sqrt{-c^2 d x^2+d}}{6 d^3 \sqrt{c x-1}\sqrt{c x+1}}$$

Result(type 3, 1349 leaves):

$$-\frac{a}{d x\left(-c^2 d x^2+d\right)^{3/2}}+\frac{4 a c^2 x}{3 d\left(-c^2 d x^2+d\right)^{3/2}}+\frac{8 a c^2 x}{3 d^2\sqrt{-c^2 d x^2+d}}-\frac{16 b\sqrt{-d\left(c^2 x^2-1\right)}\sqrt{c x-1}\sqrt{c x+1}\operatorname{arccosh}(c x) c}{3 d^3\left(c^2 x^2-1\right)}$$
$$+\frac{32 b\sqrt{-d\left(c^2 x^2-1\right)} x^7 (c x-1)(c x+1) c^8}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}-\frac{32 b\sqrt{-d\left(c^2 x^2-1\right)} x^9 c^{10}}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}-\frac{80 b\sqrt{-d\left(c^2 x^2-1\right)} x^5 (c x-1)(c x+1) c^6}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}$$
$$+\frac{112 b\sqrt{-d\left(c^2 x^2-1\right)} x^7 c^8}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}+\frac{64 b\sqrt{-d\left(c^2 x^2-1\right)} x^4\operatorname{arccosh}(c x)\sqrt{c x-1}\sqrt{c x+1} c^5}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}-\frac{64 b\sqrt{-d\left(c^2 x^2-1\right)} x^5\operatorname{arccosh}(c x) c^6}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}$$
$$+\frac{20 b\sqrt{-d\left(c^2 x^2-1\right)} x^3 (c x-1)(c x+1) c^4}{d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}-\frac{140 b\sqrt{-d\left(c^2 x^2-1\right)} x^5 c^6}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}$$
$$-\frac{136 b\sqrt{-d\left(c^2 x^2-1\right)} x^2\operatorname{arccosh}(c x)\sqrt{c x-1}\sqrt{c x+1} c^3}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}+\frac{56 b\sqrt{-d\left(c^2 x^2-1\right)} x^3\operatorname{arccosh}(c x) c^4}{d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}-\frac{4 b\sqrt{-d\left(c^2 x^2-1\right)} x (c x-1)(c x+1) c^2}{d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}$$
$$+\frac{4 b\sqrt{-d\left(c^2 x^2-1\right)} x^2\sqrt{c x+1}\sqrt{c x-1} c^3}{3 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}+\frac{24 b\sqrt{-d\left(c^2 x^2-1\right)} x^3 c^4}{d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}+\frac{24 b\sqrt{-d\left(c^2 x^2-1\right)}\operatorname{arccosh}(c x)\sqrt{c x-1}\sqrt{c x+1} c}{d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}$$
$$-\frac{44 b\sqrt{-d\left(c^2 x^2-1\right)} x\operatorname{arccosh}(c x) c^2}{d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}-\frac{3 b\sqrt{-d\left(c^2 x^2-1\right)}\sqrt{c x-1}\sqrt{c x+1} c}{2 d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}-\frac{4 b\sqrt{-d\left(c^2 x^2-1\right)} x c^2}{d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right)}$$
$$+\frac{9 b\sqrt{-d\left(c^2 x^2-1\right)}\operatorname{arccosh}(c x)}{d^3\left(8 c^6 x^6-25 c^4 x^4+26 c^2 x^2-9\right) x}+\frac{b\sqrt{-d\left(c^2 x^2-1\right)}\sqrt{c x-1}\sqrt{c x+1}\ln\left(1+\left(c x+\sqrt{c x-1}\sqrt{c x+1}\right)^2\right) c}{d^3\left(c^2 x^2-1\right)}$$
$$+\frac{5 b\sqrt{-d\left(c^2 x^2-1\right)}\sqrt{c x-1}\sqrt{c x+1}\ln\left(\left(c x+\sqrt{c x-1}\sqrt{c x+1}\right)^2-1\right) c}{3 d^3\left(c^2 x^2-1\right)}$$

Problem 40: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 295 leaves, 5 steps):

$$\frac{-a-b\operatorname{arccosh}(c x)}{3 d x^3\left(-c^2 d x^2+d\right)^{3/2}}-\frac{2 c^2\left(a+b\operatorname{arccosh}(c x)\right)}{d x\left(-c^2 d x^2+d\right)^{3/2}}+\frac{8 c^4 x\left(a+b\operatorname{arccosh}(c x)\right)}{3 d\left(-c^2 d x^2+d\right)^{3/2}}+\frac{16 c^4 x\left(a+b\operatorname{arccosh}(c x)\right)}{3 d^2\sqrt{-c^2 d x^2+d}}-\frac{b c\sqrt{-c^2 d x^2+d}}{6 d^3 x^2\sqrt{c x-1}\sqrt{c x+1}}$$
$$-\frac{b c^3\sqrt{-c^2 d x^2+d}}{6 d^3\left(-c^2 x^2+1\right)\sqrt{c x-1}\sqrt{c x+1}}+\frac{8 b c^3\ln(x)\sqrt{-c^2 d x^2+d}}{3 d^3\sqrt{c x-1}\sqrt{c x+1}}+\frac{4 b c^3\ln(-c^2 x^2+1)\sqrt{-c^2 d x^2+d}}{3 d^3\sqrt{c x-1}\sqrt{c x+1}}$$

Result(type 3, 1877 leaves):

$$
-\frac{128 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{11} c^{14}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}+\frac{448 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{9} c^{12}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}-\frac{560 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{7} c^{10}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
+\frac{280 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{5} c^{8}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}-\frac{32 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{3} c^{6}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
-\frac{8 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x c^{4}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}+\frac{b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x)}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right) x^{3}}+\frac{8 a c^{4} x}{3 d\left(-c^{2} d x^{2}+d\right)^{3/2}}
$$

$$
+\frac{16 a c^{4} x}{3 d^{2} \sqrt{-c^{2} d x^{2}+d}}-\frac{2 a c^{2}}{d x\left(-c^{2} d x^{2}+d\right)^{3/2}}+\frac{6 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x) c^{2}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right) x}-\frac{2 b \sqrt{-d\left(c^{2} x^{2}-1\right)} \sqrt{c x+1} \sqrt{c x-1}\, c^{3}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
-\frac{64 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{7} \operatorname{arccosh}(c x) c^{10}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}+\frac{160 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{5} \operatorname{arccosh}(c x) c^{8}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
-\frac{344 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{3} \operatorname{arccosh}(c x) c^{6}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}+\frac{12 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x \operatorname{arccosh}(c x) c^{4}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
+\frac{16 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x) \sqrt{c x-1} \sqrt{c x+1}\, c^{3}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}+\frac{128 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{9}(c x-1)(c x+1) c^{12}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
-\frac{320 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{7}(c x-1)(c x+1) c^{10}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}+\frac{80 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{5}(c x-1)(c x+1) c^{8}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
-\frac{40 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{3}(c x-1)(c x+1) c^{6}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}-\frac{8 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x(c x-1)(c x+1) c^{4}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
+\frac{2 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{2} \sqrt{c x+1} \sqrt{c x-1}\, c^{5}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}-\frac{b \sqrt{-d\left(c^{2} x^{2}-1\right)} \sqrt{c x-1} \sqrt{c x+1}\, c}{6 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right) x^{2}}
$$

$$
-\frac{32 b \sqrt{-d\left(c^{2} x^{2}-1\right)} \sqrt{c x-1} \sqrt{c x+1}\, \operatorname{arccosh}(c x) c^{3}}{3 d^{3}\left(c^{2} x^{2}-1\right)}+\frac{176 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{2} \operatorname{arccosh}(c x) \sqrt{c x-1} \sqrt{c x+1}\, c^{5}}{3 d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
+\frac{64 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{6} \operatorname{arccosh}(c x) \sqrt{c x-1} \sqrt{c x+1}\, c^{9}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}-\frac{128 b \sqrt{-d\left(c^{2} x^{2}-1\right)}\, x^{4} \operatorname{arccosh}(c x) \sqrt{c x-1} \sqrt{c x+1}\, c^{7}}{d^{3}\left(12 c^{8} x^{8}-36 c^{6} x^{6}+35 c^{4} x^{4}-10 c^{2} x^{2}-1\right)}
$$

$$
+\frac{8 b \sqrt{-d\left(c^{2} x^{2}-1\right)} \sqrt{c x-1} \sqrt{c x+1}\, \ln\left(\left(c x+\sqrt{c x-1} \sqrt{c x+1}\right)^{4}-1\right) c^{3}}{3 d^{3}\left(c^{2} x^{2}-1\right)}-\frac{a}{3 d x^{3}\left(-c^{2} d x^{2}+d\right)^{3/2}}
$$

```
Problem 42: Unable to integrate problem.
```

$$
\int (f x)^{m}\left(-c^{2} d x^{2}+d\right)(a+b \operatorname{arccosh}(c x))\, dx
$$

```
Optimal(type 5, 170 leaves, 6 steps):
```

$$\frac{d\,(fx)^{1+m}\,(a+b\,\mathrm{arccosh}(cx))}{f(1+m)}-\frac{c^2 d\,(fx)^{3+m}\,(a+b\,\mathrm{arccosh}(cx))}{f^3\,(3+m)}+\frac{b\,c\,d\,(fx)^{2+m}\sqrt{cx-1}\,\sqrt{cx+1}}{f^2\,(3+m)^2}$$
$$-\frac{b\,c\,d\,(7+3m)\,(fx)^{2+m}\,\mathrm{hypergeom}\left(\left[\frac{1}{2},1+\frac{m}{2}\right],\left[2+\frac{m}{2}\right],c^2x^2\right)\sqrt{-c^2x^2+1}}{f^2\,(1+m)\,(2+m)\,(3+m)^2\sqrt{cx-1}\,\sqrt{cx+1}}$$

Result(type 8, 27 leaves):

$$\int (fx)^m\left(-c^2dx^2+d\right)(a+b\,\mathrm{arccosh}(cx))\,dx$$

Problem 44: Unable to integrate problem.

$$\int (fx)^m\left(-c^2dx^2+d\right)^{3/2}(a+b\,\mathrm{arccosh}(cx))\,dx$$

Optimal(type 5, 407 leaves, 7 steps):

$$\frac{(fx)^{1+m}\left(-c^2dx^2+d\right)^{3/2}(a+b\,\mathrm{arccosh}(cx))}{f(4+m)}+\frac{3d\,(fx)^{1+m}\,(a+b\,\mathrm{arccosh}(cx))\sqrt{-c^2dx^2+d}}{f\left(m^2+6m+8\right)}$$
$$+\frac{3d\,(fx)^{1+m}\,(a+b\,\mathrm{arccosh}(cx))\,\mathrm{hypergeom}\left(\left[\frac{1}{2},\frac{m}{2}+\frac{1}{2}\right],\left[\frac{3}{2}+\frac{m}{2}\right],c^2x^2\right)\sqrt{-c^2dx^2+d}}{f(4+m)\left(m^2+3m+2\right)\sqrt{-cx+1}\,\sqrt{cx+1}}-\frac{3b\,c\,d\,(fx)^{2+m}\sqrt{-c^2dx^2+d}}{f^2\,(2+m)^2\,(4+m)\sqrt{cx-1}\,\sqrt{cx+1}}$$
$$-\frac{b\,c\,d\,(fx)^{2+m}\sqrt{-c^2dx^2+d}}{f^2\,(2+m)\,(4+m)\sqrt{cx-1}\,\sqrt{cx+1}}+\frac{b\,c^3 d\,(fx)^{4+m}\sqrt{-c^2dx^2+d}}{f^4\,(4+m)^2\sqrt{cx-1}\,\sqrt{cx+1}}$$
$$-\frac{3b\,c\,d\,(fx)^{2+m}\,\mathit{HypergeometricPFQ}\left(\left[1,1+\frac{m}{2},1+\frac{m}{2}\right],\left[\frac{3}{2}+\frac{m}{2},2+\frac{m}{2}\right],c^2x^2\right)\sqrt{-c^2dx^2+d}}{f^2\,(1+m)\,(2+m)^2\,(4+m)\sqrt{cx-1}\,\sqrt{cx+1}}$$

Result(type 8, 29 leaves):

$$\int (fx)^m\left(-c^2dx^2+d\right)^{3/2}(a+b\,\mathrm{arccosh}(cx))\,dx$$

Problem 45: Unable to integrate problem.

$$\int \frac{(fx)^m\,(a+b\,\mathrm{arccosh}(cx))}{\left(-c^2dx^2+d\right)^{3/2}}\,dx$$

Optimal(type 5, 266 leaves, 4 steps):

$$\frac{(fx)^{1+m}\,(a+b\,\mathrm{arccosh}(cx))}{d\,f\sqrt{-c^2dx^2+d}}+\frac{b\,c\,(fx)^{2+m}\,\mathrm{hypergeom}\left(\left[1,1+\frac{m}{2}\right],\left[2+\frac{m}{2}\right],c^2x^2\right)\sqrt{cx-1}\,\sqrt{cx+1}}{d\,f^2\,(2+m)\sqrt{-c^2dx^2+d}}$$

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

$$-\frac{m (f x)^{1+m} (a+b \operatorname{arccosh}(c x)) \operatorname{hypergeom}\left(\left[\frac{1}{2}, \frac{m}{2}+\frac{1}{2}\right], \left[\frac{3}{2}+\frac{m}{2}\right], c^2 x^2\right) \sqrt{-c^2 x^2+1}}{d f (1+m) \sqrt{-c^2 d x^2+d}}$$

Result(type 8, 29 leaves):

$$\int \frac{(f x)^m (a+b \operatorname{arccosh}(c x))}{(-c^2 d x^2+d)^{3/2}}\, dx$$

Problem 46: Unable to integrate problem.

$$\int \frac{(f x)^m (a+b \operatorname{arccosh}(c x))}{(-c^2 d x^2+d)^{5/2}}\, dx$$

Optimal(type 5, 394 leaves, 7 steps):

$$\frac{(f x)^{1+m} (a+b \operatorname{arccosh}(c x))}{3 d f (-c^2 d x^2+d)^{3/2}}+\frac{(2-m) (f x)^{1+m} (a+b \operatorname{arccosh}(c x))}{3 d^2 f \sqrt{-c^2 d x^2+d}}$$

$$+\frac{b c (2-m) (f x)^{2+m} \operatorname{hypergeom}\left(\left[1, 1+\frac{m}{2}\right], \left[2+\frac{m}{2}\right], c^2 x^2\right) \sqrt{c x-1}\, \sqrt{c x+1}}{3 d^2 f^2 (2+m) \sqrt{-c^2 d x^2+d}}$$

$$+\frac{b c (f x)^{2+m} \operatorname{hypergeom}\left(\left[2, 1+\frac{m}{2}\right], \left[2+\frac{m}{2}\right], c^2 x^2\right) \sqrt{c x-1}\, \sqrt{c x+1}}{3 d^2 f^2 (2+m) \sqrt{-c^2 d x^2+d}}$$

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

$$-\frac{(2-m) m (f x)^{1+m} (a+b \operatorname{arccosh}(c x)) \operatorname{hypergeom}\left(\left[\frac{1}{2}, \frac{m}{2}+\frac{1}{2}\right], \left[\frac{3}{2}+\frac{m}{2}\right], c^2 x^2\right) \sqrt{-c^2 x^2+1}}{3 d^2 f (1+m) \sqrt{-c^2 d x^2+d}}$$

Result(type 8, 29 leaves):

$$\int \frac{(f x)^m (a+b \operatorname{arccosh}(c x))}{(-c^2 d x^2+d)^{5/2}}\, dx$$

Problem 49: Result more than twice size of optimal antiderivative.

$$\int x (-c^2 d x^2+d)^{5/2} (a+b \operatorname{arccosh}(c x))^2\, dx$$

Optimal(type 3, 418 leaves, 8 steps):

$$-\frac{(-c^2 d x^2+d)^{7/2} (a+b \operatorname{arccosh}(c x))^2}{7 c^2 d}-\frac{32 b^2 d^2 (-c^2 x^2+1) \sqrt{-c^2 d x^2+d}}{245 c^2 (-c x+1) (c x+1)}-\frac{16 b^2 d^2 (-c^2 x^2+1)^2 \sqrt{-c^2 d x^2+d}}{735 c^2 (-c x+1) (c x+1)}$$
$$-\frac{12 b^2 d^2 (-c^2 x^2+1)^3 \sqrt{-c^2 d x^2+d}}{1225 c^2 (-c x+1) (c x+1)}-\frac{2 b^2 d^2 (-c^2 x^2+1)^4 \sqrt{-c^2 d x^2+d}}{343 c^2 (-c x+1) (c x+1)}+\frac{2 b d^2 x (a+b \operatorname{arccosh}(c x)) \sqrt{-c^2 d x^2+d}}{7 c \sqrt{c x-1} \sqrt{c x+1}}$$
$$-\frac{2 b c d^2 x^3 (a+b \operatorname{arccosh}(c x)) \sqrt{-c^2 d x^2+d}}{7 \sqrt{c x-1} \sqrt{c x+1}}+\frac{6 b c^3 d^2 x^5 (a+b \operatorname{arccosh}(c x)) \sqrt{-c^2 d x^2+d}}{35 \sqrt{c x-1} \sqrt{c x+1}}-\frac{2 b c^5 d^2 x^7 (a+b \operatorname{arccosh}(c x)) \sqrt{-c^2 d x^2+d}}{49 \sqrt{c x-1} \sqrt{c x+1}}$$

Result(type 3, 1957 leaves):

$$-\frac{a^2 (-c^2 d x^2+d)^{7/2}}{7 c^2 d}+b^2 \left(\frac{1}{43904 (c x+1) c^2 (c x-1)}\left(\sqrt{-d (c^2 x^2-1)}\, \left(64 c^8 x^8-144 c^6 x^6+64 \sqrt{c x+1}\, \sqrt{c x-1}\, x^7 c^7+104 c^4 x^4\right.\right.\right.$$
$$\left.\left.-112 \sqrt{c x+1}\, \sqrt{c x-1}\, x^5 c^5-25 c^2 x^2+56 c^3 x^3 \sqrt{c x-1}\, \sqrt{c x+1}-7 \sqrt{c x-1}\, \sqrt{c x+1}\, x c+1\right) (49 \operatorname{arccosh}(c x)^2-14 \operatorname{arccosh}(c x)+2) d^2\right)$$
$$-\frac{1}{3200 (c x+1) c^2 (c x-1)}\left(\sqrt{-d (c^2 x^2-1)}\, \left(16 c^6 x^6-28 c^4 x^4+16 \sqrt{c x+1}\, \sqrt{c x-1}\, x^5 c^5+13 c^2 x^2-20 c^3 x^3 \sqrt{c x-1}\, \sqrt{c x+1}\right.\right.$$
$$\left.\left.+5 \sqrt{c x-1}\, \sqrt{c x+1}\, x c-1\right) (25 \operatorname{arccosh}(c x)^2-10 \operatorname{arccosh}(c x)+2) d^2\right)$$
$$+\frac{\sqrt{-d (c^2 x^2-1)}\, \left(4 c^4 x^4-5 c^2 x^2+4 c^3 x^3 \sqrt{c x-1}\, \sqrt{c x+1}-3 \sqrt{c x-1}\, \sqrt{c x+1}\, x c+1\right) (9 \operatorname{arccosh}(c x)^2-6 \operatorname{arccosh}(c x)+2) d^2}{384 (c x+1) c^2 (c x-1)}$$
$$-\frac{5 \sqrt{-d (c^2 x^2-1)}\, \left(\sqrt{c x-1}\, \sqrt{c x+1}\, x c+c^2 x^2-1\right) (\operatorname{arccosh}(c x)^2-2 \operatorname{arccosh}(c x)+2) d^2}{128 (c x+1) c^2 (c x-1)}$$
$$-\frac{5 \sqrt{-d (c^2 x^2-1)}\, \left(-\sqrt{c x-1}\, \sqrt{c x+1}\, x c+c^2 x^2-1\right) (\operatorname{arccosh}(c x)^2+2 \operatorname{arccosh}(c x)+2) d^2}{128 (c x+1) c^2 (c x-1)}$$
$$+\frac{\sqrt{-d (c^2 x^2-1)}\, \left(-4 c^3 x^3 \sqrt{c x-1}\, \sqrt{c x+1}+4 c^4 x^4+3 \sqrt{c x-1}\, \sqrt{c x+1}\, x c-5 c^2 x^2+1\right) (9 \operatorname{arccosh}(c x)^2+6 \operatorname{arccosh}(c x)+2) d^2}{384 (c x+1) c^2 (c x-1)}$$
$$-\frac{1}{3200 (c x+1) c^2 (c x-1)}\left(\sqrt{-d (c^2 x^2-1)}\, \left(-16 \sqrt{c x+1}\, \sqrt{c x-1}\, x^5 c^5+16 c^6 x^6+20 c^3 x^3 \sqrt{c x-1}\, \sqrt{c x+1}-28 c^4 x^4-5 \sqrt{c x-1}\, \sqrt{c x+1}\, x c\right.\right.$$
$$\left.\left.+13 c^2 x^2-1\right) (25 \operatorname{arccosh}(c x)^2+10 \operatorname{arccosh}(c x)+2) d^2\right)+\frac{1}{43904 (c x+1) c^2 (c x-1)}\left(\sqrt{-d (c^2 x^2-1)}\, \left(-64 \sqrt{c x+1}\, \sqrt{c x-1}\, x^7 c^7\right.\right.$$
$$+64 c^8 x^8+112 \sqrt{c x+1}\, \sqrt{c x-1}\, x^5 c^5-144 c^6 x^6-56 c^3 x^3 \sqrt{c x-1}\, \sqrt{c x+1}+104 c^4 x^4+7 \sqrt{c x-1}\, \sqrt{c x+1}\, x c-25 c^2 x^2+1\Big) (49 \operatorname{arccosh}(c x)^2$$
$$\left.\left.\left.+14 \operatorname{arccosh}(c x)+2\right) d^2\right)\right)+2 a b \left(\frac{1}{6272 (c x+1) c^2 (c x-1)}\left(\sqrt{-d (c^2 x^2-1)}\, \left(64 c^8 x^8-144 c^6 x^6+64 \sqrt{c x+1}\, \sqrt{c x-1}\, x^7 c^7+104 c^4 x^4\right.\right.\right.$$

$$- 112 \sqrt{cx+1}\, \sqrt{cx-1}\, x^5 c^5 - 25 c^2 x^2 + 56 c^3 x^3 \sqrt{cx-1}\, \sqrt{cx+1} - 7 \sqrt{cx-1}\, \sqrt{cx+1}\, x c + 1\Big) \left(-1 + 7 \operatorname{arccosh}(cx)\right) d^2\Big)$$

$$- \frac{1}{640\,(cx+1)\, c^2\,(cx-1)} \Big(\sqrt{-d\,(c^2 x^2 - 1)}\, \Big(16 c^6 x^6 - 28 c^4 x^4 + 16 \sqrt{cx+1}\, \sqrt{cx-1}\, x^5 c^5 + 13 c^2 x^2 - 20 c^3 x^3 \sqrt{cx-1}\, \sqrt{cx+1}$$

$$+ 5 \sqrt{cx-1}\, \sqrt{cx+1}\, x c - 1\Big) \left(-1 + 5 \operatorname{arccosh}(cx)\right) d^2\Big)$$

$$+ \frac{\sqrt{-d\,(c^2 x^2 - 1)}\, \left(4 c^4 x^4 - 5 c^2 x^2 + 4 c^3 x^3 \sqrt{cx-1}\, \sqrt{cx+1} - 3 \sqrt{cx-1}\, \sqrt{cx+1}\, x c + 1\right) \left(-1 + 3 \operatorname{arccosh}(cx)\right) d^2}{128\,(cx+1)\, c^2\,(cx-1)}$$

$$- \frac{5 \sqrt{-d\,(c^2 x^2 - 1)}\, \left(\sqrt{cx-1}\, \sqrt{cx+1}\, x c + c^2 x^2 - 1\right) \left(\operatorname{arccosh}(cx) - 1\right) d^2}{128\,(cx+1)\, c^2\,(cx-1)}$$

$$- \frac{5 \sqrt{-d\,(c^2 x^2 - 1)}\, \left(-\sqrt{cx-1}\, \sqrt{cx+1}\, x c + c^2 x^2 - 1\right) \left(\operatorname{arccosh}(cx) + 1\right) d^2}{128\,(cx+1)\, c^2\,(cx-1)}$$

$$+ \frac{\sqrt{-d\,(c^2 x^2 - 1)}\, \left(-4 c^3 x^3 \sqrt{cx-1}\, \sqrt{cx+1} + 4 c^4 x^4 + 3 \sqrt{cx-1}\, \sqrt{cx+1}\, x c - 5 c^2 x^2 + 1\right) \left(1 + 3 \operatorname{arccosh}(cx)\right) d^2}{128\,(cx+1)\, c^2\,(cx-1)}$$

$$- \frac{1}{640\,(cx+1)\, c^2\,(cx-1)} \Big(\sqrt{-d\,(c^2 x^2 - 1)}\, \Big(-16 \sqrt{cx+1}\, \sqrt{cx-1}\, x^5 c^5 + 16 c^6 x^6 + 20 c^3 x^3 \sqrt{cx-1}\, \sqrt{cx+1} - 28 c^4 x^4 - 5 \sqrt{cx-1}\, \sqrt{cx+1}\, x c$$

$$+ 13 c^2 x^2 - 1\Big) \left(1 + 5 \operatorname{arccosh}(cx)\right) d^2\Big) + \frac{1}{6272\,(cx+1)\, c^2\,(cx-1)} \Big(\sqrt{-d\,(c^2 x^2 - 1)}\, \Big(-64 \sqrt{cx+1}\, \sqrt{cx-1}\, x^7 c^7 + 64 c^8 x^8$$

$$+ 112 \sqrt{cx+1}\, \sqrt{cx-1}\, x^5 c^5 - 144 c^6 x^6 - 56 c^3 x^3 \sqrt{cx-1}\, \sqrt{cx+1} + 104 c^4 x^4 + 7 \sqrt{cx-1}\, \sqrt{cx+1}\, x c - 25 c^2 x^2 + 1\Big) \left(1 + 7 \operatorname{arccosh}(cx)\right) d^2\Big)\Bigg)$$

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Problem 50: Unable to integrate problem.
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$$\int \frac{\left(-c^2 d x^2 + d\right)^{5/2} \left(a + b \operatorname{arccosh}(cx)\right)^2}{x}\, dx$$

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Optimal(type 4, 797 leaves, 26 steps):
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$$\frac{d\left(-c^2 d x^2 + d\right)^{3/2} \left(a + b \operatorname{arccosh}(cx)\right)^2}{3} + \frac{\left(-c^2 d x^2 + d\right)^{5/2} \left(a + b \operatorname{arccosh}(cx)\right)^2}{5} + \frac{68 b^2 d^2 \sqrt{-c^2 d x^2 + d}}{27} - \frac{2 b^2 c^2 d^2 x^2 \sqrt{-c^2 d x^2 + d}}{27}$$

$$+ \frac{16 b^2 d^2 \left(-c^2 x^2 + 1\right) \sqrt{-c^2 d x^2 + d}}{75\,(-cx+1)\,(cx+1)} + \frac{8 b^2 d^2 \left(-c^2 x^2 + 1\right)^2 \sqrt{-c^2 d x^2 + d}}{225\,(-cx+1)\,(cx+1)} + \frac{2 b^2 d^2 \left(-c^2 x^2 + 1\right)^3 \sqrt{-c^2 d x^2 + d}}{125\,(-cx+1)\,(cx+1)} + d^2 \big(a$$

$$+ b \operatorname{arccosh}(cx)\big)^2 \sqrt{-c^2 d x^2 + d} - \frac{2 a b c d^2 x \sqrt{-c^2 d x^2 + d}}{\sqrt{cx-1}\, \sqrt{cx+1}} - \frac{2 b^2 c d^2 x \operatorname{arccosh}(cx) \sqrt{-c^2 d x^2 + d}}{\sqrt{cx-1}\, \sqrt{cx+1}} - \frac{16 b c d^2 x \left(a + b \operatorname{arccosh}(cx)\right) \sqrt{-c^2 d x^2 + d}}{15 \sqrt{cx-1}\, \sqrt{cx+1}}$$

$$+\frac{22 b c^3 d^2 x^3 (a+b\operatorname{arccosh}(c x))\sqrt{-c^2 d x^2+d}}{45\sqrt{c x-1}\sqrt{c x+1}}-\frac{2 b c^5 d^2 x^5 (a+b\operatorname{arccosh}(c x))\sqrt{-c^2 d x^2+d}}{25\sqrt{c x-1}\sqrt{c x+1}}$$

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

$$-\frac{2 I b d^2 (a+b\operatorname{arccosh}(c x))\operatorname{polylog}\left(2, I\left(c x+\sqrt{c x-1}\sqrt{c x+1}\right)\right)\sqrt{-c^2 d x^2+d}}{\sqrt{c x-1}\sqrt{c x+1}}$$

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

$$+\frac{2 I b d^2 (a+b\operatorname{arccosh}(c x))\operatorname{polylog}\left(2, -I\left(c x+\sqrt{c x-1}\sqrt{c x+1}\right)\right)\sqrt{-c^2 d x^2+d}}{\sqrt{c x-1}\sqrt{c x+1}}$$

Result(type 8, 29 leaves):

$$\int \frac{(-c^2 d x^2+d)^{5/2} (a+b\operatorname{arccosh}(c x))^2}{x}\, dx$$

Problem 51: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2 (a+b\operatorname{arccosh}(c x))^2}{\sqrt{-c^2 d x^2+d}}\, dx$$

Optimal(type 3, 194 leaves, 5 steps):

$$-\frac{b^2 x (-c x+1)(c x+1)}{4 c^2\sqrt{-c^2 d x^2+d}}+\frac{b^2 \operatorname{arccosh}(c x)\sqrt{c x-1}\sqrt{c x+1}}{4 c^3\sqrt{-c^2 d x^2+d}}-\frac{b x^2 (a+b\operatorname{arccosh}(c x))\sqrt{c x-1}\sqrt{c x+1}}{2 c\sqrt{-c^2 d x^2+d}}$$

$$+\frac{(a+b\operatorname{arccosh}(c x))^3\sqrt{c x-1}\sqrt{c x+1}}{6 b c^3\sqrt{-c^2 d x^2+d}}-\frac{x (a+b\operatorname{arccosh}(c x))^2\sqrt{-c^2 d x^2+d}}{2 c^2 d}$$

Result(type 3, 623 leaves):

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

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

$$-\frac{b^2\sqrt{-d(c^2 x^2-1)}\sqrt{c x-1}\sqrt{c x+1}\operatorname{arccosh}(c x)^3}{6 d c^3 (c^2 x^2-1)}-\frac{b^2\sqrt{-d(c^2 x^2-1)}\operatorname{arccosh}(c x)\sqrt{c x-1}\sqrt{c x+1}}{4 d c^3 (c^2 x^2-1)}$$

$$- \frac{a b \sqrt{-d (c^2 x^2 - 1)} \sqrt{c x - 1} \sqrt{c x + 1} \operatorname{arccosh}(c x)^2}{2 d c^3 (c^2 x^2 - 1)} - \frac{a b \sqrt{-d (c^2 x^2 - 1)} \operatorname{arccosh}(c x) x^3}{d (c^2 x^2 - 1)} + \frac{a b \sqrt{-d (c^2 x^2 - 1)} \sqrt{c x + 1} \sqrt{c x - 1} x^2}{2 d c (c^2 x^2 - 1)}$$

$$+ \frac{a b \sqrt{-d (c^2 x^2 - 1)} \operatorname{arccosh}(c x) x}{d c^2 (c^2 x^2 - 1)} - \frac{a b \sqrt{-d (c^2 x^2 - 1)} \sqrt{c x - 1} \sqrt{c x + 1}}{4 d c^3 (c^2 x^2 - 1)}$$

Problem 52: Unable to integrate problem.

$$\int \frac{(a + b \operatorname{arccosh}(c x))^2}{x \sqrt{-c^2 d x^2 + d}} \, dx$$

Optimal(type 4, 300 leaves, 8 steps):

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

$$- \frac{2 I b (a + b \operatorname{arccosh}(c x)) \operatorname{polylog}\left(2, -I \left(c x + \sqrt{c x - 1} \sqrt{c x + 1}\right)\right) \sqrt{c x - 1} \sqrt{c x + 1}}{\sqrt{-c^2 d x^2 + d}}$$

$$+ \frac{2 I b (a + b \operatorname{arccosh}(c x)) \operatorname{polylog}\left(2, I \left(c x + \sqrt{c x - 1} \sqrt{c x + 1}\right)\right) \sqrt{c x - 1} \sqrt{c x + 1}}{\sqrt{-c^2 d x^2 + d}}$$

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

Result(type 8, 29 leaves):

$$\int \frac{(a + b \operatorname{arccosh}(c x))^2}{x \sqrt{-c^2 d x^2 + d}} \, dx$$

Problem 53: Result more than twice size of optimal antiderivative.

$$\int \frac{x^4 (a + b \operatorname{arccosh}(c x))^2}{(-c^2 d x^2 + d)^{3/2}} \, dx$$

Optimal(type 4, 414 leaves, 15 steps):

$$\frac{b^2 x (-c x + 1) (c x + 1)}{4 c^4 d \sqrt{-c^2 d x^2 + d}} + \frac{x^3 (a + b \operatorname{arccosh}(c x))^2}{c^2 d \sqrt{-c^2 d x^2 + d}} - \frac{b^2 \operatorname{arccosh}(c x) \sqrt{c x - 1} \sqrt{c x + 1}}{4 c^5 d \sqrt{-c^2 d x^2 + d}} + \frac{b x^2 (a + b \operatorname{arccosh}(c x)) \sqrt{c x - 1} \sqrt{c x + 1}}{2 c^3 d \sqrt{-c^2 d x^2 + d}}$$

$$+ \frac{(a + b \operatorname{arccosh}(c x))^2 \sqrt{c x - 1} \sqrt{c x + 1}}{c^5 d \sqrt{-c^2 d x^2 + d}} - \frac{(a + b \operatorname{arccosh}(c x))^3 \sqrt{c x - 1} \sqrt{c x + 1}}{2 b c^5 d \sqrt{-c^2 d x^2 + d}}$$

$$-\frac{2 b \left(a+b \operatorname{arccosh}(c x)\right) \ln\left(1-\left(c x+\sqrt{c x-1}\,\sqrt{c x+1}\right)^{2}\right) \sqrt{c x-1}\,\sqrt{c x+1}}{c^{5} d \sqrt{-c^{2} d x^{2}+d}}-\frac{b^{2} \operatorname{polylog}\left(2,\left(c x+\sqrt{c x-1}\,\sqrt{c x+1}\right)^{2}\right) \sqrt{c x-1}\,\sqrt{c x+1}}{c^{5} d \sqrt{-c^{2} d x^{2}+d}}$$
$$+\frac{3 x \left(a+b \operatorname{arccosh}(c x)\right)^{2} \sqrt{-c^{2} d x^{2}+d}}{2 c^{4} d^{2}}$$

Result(type 4, 1140 leaves):

$$-\frac{a^{2} x^{3}}{2 c^{2} d \sqrt{-c^{2} d x^{2}+d}}+\frac{3 a^{2} x}{2 c^{4} d \sqrt{-c^{2} d x^{2}+d}}-\frac{3 a^{2} \arctan\left(\frac{\sqrt{c^{2} d}\, x}{\sqrt{-c^{2} d x^{2}+d}}\right)}{2 c^{4} d \sqrt{c^{2} d}}+\frac{b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, x^{3}}{4 d^{2} c^{2} \left(c^{2} x^{2}-1\right)}-\frac{b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, x}{4 d^{2} c^{4} \left(c^{2} x^{2}-1\right)}$$
$$-\frac{b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}\, \operatorname{arccosh}(c x)^{2}}{d^{2} c^{5} \left(c^{2} x^{2}-1\right)}-\frac{b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x) \sqrt{c x-1}\,\sqrt{c x+1}\, x^{2}}{2 d^{2} c^{3} \left(c^{2} x^{2}-1\right)}$$
$$+\frac{2 b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}\, \operatorname{arccosh}(c x) \ln\left(1-c x-\sqrt{c x-1}\,\sqrt{c x+1}\right)}{d^{2} c^{5} \left(c^{2} x^{2}-1\right)}$$
$$+\frac{2 b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}\, \operatorname{arccosh}(c x) \ln\left(1+c x+\sqrt{c x-1}\,\sqrt{c x+1}\right)}{d^{2} c^{5} \left(c^{2} x^{2}-1\right)}+\frac{b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x)^{2} x^{3}}{2 d^{2} c^{2} \left(c^{2} x^{2}-1\right)}$$
$$-\frac{3 b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x)^{2} x}{2 d^{2} c^{4} \left(c^{2} x^{2}-1\right)}+\frac{2 b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}\, \operatorname{polylog}\left(2, c x+\sqrt{c x-1}\,\sqrt{c x+1}\right)}{d^{2} c^{5} \left(c^{2} x^{2}-1\right)}$$
$$+\frac{b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x) \sqrt{c x-1}\,\sqrt{c x+1}}{4 d^{2} c^{5} \left(c^{2} x^{2}-1\right)}+\frac{2 b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}\, \operatorname{polylog}\left(2, -c x-\sqrt{c x-1}\,\sqrt{c x+1}\right)}{d^{2} c^{5} \left(c^{2} x^{2}-1\right)}$$
$$+\frac{b^{2} \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}\, \operatorname{arccosh}(c x)^{3}}{2 d^{2} c^{5} \left(c^{2} x^{2}-1\right)}+\frac{3 a b \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}\, \operatorname{arccosh}(c x)^{2}}{2 d^{2} c^{5} \left(c^{2} x^{2}-1\right)}$$
$$+\frac{a b \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x) x^{3}}{d^{2} c^{2} \left(c^{2} x^{2}-1\right)}-\frac{a b \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x+1}\,\sqrt{c x-1}\, x^{2}}{2 d^{2} c^{3} \left(c^{2} x^{2}-1\right)}-\frac{2 a b \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x) \sqrt{c x-1}\,\sqrt{c x+1}}{d^{2} c^{5} \left(c^{2} x^{2}-1\right)}$$
$$-\frac{3 a b \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \operatorname{arccosh}(c x) x}{d^{2} c^{4} \left(c^{2} x^{2}-1\right)}+\frac{a b \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}}{4 d^{2} c^{5} \left(c^{2} x^{2}-1\right)}$$
$$+\frac{2 a b \sqrt{-d \left(c^{2} x^{2}-1\right)}\, \sqrt{c x-1}\,\sqrt{c x+1}\, \ln\left(\left(c x+\sqrt{c x-1}\,\sqrt{c x+1}\right)^{2}-1\right)}{d^{2} c^{5} \left(c^{2} x^{2}-1\right)}$$

Problem 54: Result more than twice size of optimal antiderivative.

$$\int \frac{x^{2} \left(a+b \operatorname{arccosh}(c x)\right)^{2}}{\left(-c^{2} d x^{2}+d\right)^{3/2}}\, dx$$

Optimal(type 4, 255 leaves, 8 steps):

$$\frac{x\left(a+b\operatorname{arccosh}(cx)\right)^2}{c^2 d\sqrt{-c^2 d x^2+d}}+\frac{\left(a+b\operatorname{arccosh}(cx)\right)^2\sqrt{cx-1}\,\sqrt{cx+1}}{c^3 d\sqrt{-c^2 d x^2+d}}-\frac{\left(a+b\operatorname{arccosh}(cx)\right)^3\sqrt{cx-1}\,\sqrt{cx+1}}{3\,b\,c^3 d\sqrt{-c^2 d x^2+d}}$$
$$-\frac{2\,b\left(a+b\operatorname{arccosh}(cx)\right)\ln\left(1-\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)^2\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c^3 d\sqrt{-c^2 d x^2+d}}-\frac{b^2\operatorname{polylog}\left(2,\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)^2\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c^3 d\sqrt{-c^2 d x^2+d}}$$

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Result(type 4, 737 leaves):
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$$\frac{a^2 x}{c^2 d\sqrt{-c^2 d x^2+d}}-\frac{a^2\arctan\left(\frac{\sqrt{c^2 d}\,x}{\sqrt{-c^2 d x^2+d}}\right)}{c^2 d\sqrt{c^2 d}}+\frac{b^2\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\operatorname{arccosh}(cx)^3}{3\,d^2 c^3\left(c^2 x^2-1\right)}$$
$$-\frac{b^2\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\operatorname{arccosh}(cx)^2}{d^2 c^3\left(c^2 x^2-1\right)}-\frac{b^2\sqrt{-d\left(c^2 x^2-1\right)}\operatorname{arccosh}(cx)^2 x}{d^2 c^2\left(c^2 x^2-1\right)}$$
$$+\frac{2\,b^2\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\operatorname{arccosh}(cx)\ln\left(1+cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)}{d^2 c^3\left(c^2 x^2-1\right)}$$
$$+\frac{2\,b^2\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\operatorname{polylog}\left(2,-cx-\sqrt{cx-1}\,\sqrt{cx+1}\right)}{d^2 c^3\left(c^2 x^2-1\right)}$$
$$+\frac{2\,b^2\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\operatorname{arccosh}(cx)\ln\left(1-cx-\sqrt{cx-1}\,\sqrt{cx+1}\right)}{d^2 c^3\left(c^2 x^2-1\right)}$$
$$+\frac{2\,b^2\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\operatorname{polylog}\left(2,cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)}{d^2 c^3\left(c^2 x^2-1\right)}+\frac{a\,b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\operatorname{arccosh}(cx)^2}{d^2 c^3\left(c^2 x^2-1\right)}$$
$$-\frac{2\,a\,b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\operatorname{arccosh}(cx)}{d^2 c^3\left(c^2 x^2-1\right)}-\frac{2\,a\,b\sqrt{-d\left(c^2 x^2-1\right)}\operatorname{arccosh}(cx)\,x}{d^2 c^2\left(c^2 x^2-1\right)}$$
$$+\frac{2\,a\,b\sqrt{-d\left(c^2 x^2-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\ln\left(\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)^2-1\right)}{d^2 c^3\left(c^2 x^2-1\right)}$$

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

$$\int\frac{x\left(a+b\operatorname{arccosh}(cx)\right)^2}{\left(-c^2 d x^2+d\right)^{3/2}}\,dx$$

```
Optimal(type 4, 215 leaves, 8 steps):
```

$$\frac{\left(a+b\operatorname{arccosh}(cx)\right)^2}{c^2 d\sqrt{-c^2 d x^2+d}}+\frac{4\,b\left(a+b\operatorname{arccosh}(cx)\right)\operatorname{arctanh}\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c^2 d\sqrt{-c^2 d x^2+d}}$$
$$+\frac{2\,b^2\operatorname{polylog}\left(2,-cx-\sqrt{cx-1}\,\sqrt{cx+1}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c^2 d\sqrt{-c^2 d x^2+d}}-\frac{2\,b^2\operatorname{polylog}\left(2,cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c^2 d\sqrt{-c^2 d x^2+d}}$$

Result(type 4, 541 leaves):

$$\frac{a^2}{c^2 d\sqrt{-c^2 d x^2+d}}-\frac{b^2\sqrt{-d\,(c^2x^2-1)}\ \operatorname{arccosh}(cx)^2}{c^2\,(c^2x^2-1)\,d^2}-\frac{2\,b^2\sqrt{-d\,(c^2x^2-1)}\ \sqrt{cx-1}\ \sqrt{cx+1}\ \operatorname{arccosh}(cx)\ \ln\left(1+cx+\sqrt{cx-1}\ \sqrt{cx+1}\right)}{c^2\,(c^2x^2-1)\,d^2}$$
$$-\frac{2\,b^2\sqrt{-d\,(c^2x^2-1)}\ \sqrt{cx-1}\ \sqrt{cx+1}\ \operatorname{polylog}\left(2,-cx-\sqrt{cx-1}\ \sqrt{cx+1}\right)}{c^2\,(c^2x^2-1)\,d^2}$$
$$+\frac{2\,b^2\sqrt{-d\,(c^2x^2-1)}\ \sqrt{cx-1}\ \sqrt{cx+1}\ \operatorname{arccosh}(cx)\ \ln\left(1-cx-\sqrt{cx-1}\ \sqrt{cx+1}\right)}{c^2\,(c^2x^2-1)\,d^2}$$
$$+\frac{2\,b^2\sqrt{-d\,(c^2x^2-1)}\ \sqrt{cx-1}\ \sqrt{cx+1}\ \operatorname{polylog}\left(2,cx+\sqrt{cx-1}\ \sqrt{cx+1}\right)}{c^2\,(c^2x^2-1)\,d^2}-\frac{2\,a\,b\sqrt{-d\,(c^2x^2-1)}\ \operatorname{arccosh}(cx)}{c^2\,(c^2x^2-1)\,d^2}$$
$$-\frac{2\,a\,b\sqrt{-d\,(c^2x^2-1)}\ \sqrt{cx-1}\ \sqrt{cx+1}\ \ln\left(1+cx+\sqrt{cx-1}\ \sqrt{cx+1}\right)}{c^2\,(c^2x^2-1)\,d^2}$$
$$+\frac{2\,a\,b\sqrt{-d\,(c^2x^2-1)}\ \sqrt{cx-1}\ \sqrt{cx+1}\ \ln\left(cx+\sqrt{cx-1}\ \sqrt{cx+1}-1\right)}{c^2\,(c^2x^2-1)\,d^2}$$

Problem 56: Result more than twice size of optimal antiderivative.

$$\int\frac{x^2\,(a+b\operatorname{arccosh}(cx))^2}{(-c^2dx^2+d)^{5/2}}\,dx$$

Optimal(type 4, 363 leaves, 12 steps):

$$\frac{x^3\,(a+b\operatorname{arccosh}(cx))^2}{3\,d\,(-c^2dx^2+d)^{3/2}}-\frac{b^2}{3\,c^3d^2\sqrt{-c^2dx^2+d}}+\frac{b^2\,(-cx+1)}{3\,c^3d^2\sqrt{-c^2dx^2+d}}+\frac{b^2\operatorname{arccosh}(cx)\sqrt{cx-1}\ \sqrt{cx+1}}{3\,c^3d^2\sqrt{-c^2dx^2+d}}$$
$$+\frac{b\,x^2\,(a+b\operatorname{arccosh}(cx))\sqrt{cx-1}\ \sqrt{cx+1}}{3\,c\,d^2\,(-c^2x^2+1)\sqrt{-c^2dx^2+d}}-\frac{(a+b\operatorname{arccosh}(cx))^2\sqrt{cx-1}\ \sqrt{cx+1}}{3\,c^3d^2\sqrt{-c^2dx^2+d}}$$
$$+\frac{2\,b\,(a+b\operatorname{arccosh}(cx))\ln\left(1-\left(cx+\sqrt{cx-1}\ \sqrt{cx+1}\right)^2\right)\sqrt{cx-1}\ \sqrt{cx+1}}{3\,c^3d^2\sqrt{-c^2dx^2+d}}+\frac{b^2\operatorname{polylog}\left(2,\left(cx+\sqrt{cx-1}\ \sqrt{cx+1}\right)^2\right)\sqrt{cx-1}\ \sqrt{cx+1}}{3\,c^3d^2\sqrt{-c^2dx^2+d}}$$

Result(type ?, 3444 leaves): Display of huge result suppressed!

Problem 57: Unable to integrate problem.

$$\int\frac{(a+b\operatorname{arccosh}(cx))^2}{x\,(-c^2dx^2+d)^{5/2}}\,dx$$

Optimal(type 4, 621 leaves, 26 steps):

$$\frac{(a+b\operatorname{arccosh}(cx))^2}{3\,d\,(-c^2dx^2+d)^{3/2}}-\frac{b^2}{3\,d^2\sqrt{-c^2dx^2+d}}+\frac{(a+b\operatorname{arccosh}(cx))^2}{d^2\sqrt{-c^2dx^2+d}}+\frac{b\,c\,x\,(a+b\operatorname{arccosh}(cx))\sqrt{cx-1}\ \sqrt{cx+1}}{3\,d^2\,(-c^2x^2+1)\sqrt{-c^2dx^2+d}}$$

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

$$+\frac{14\,b\,(a+b\,\mathrm{arccosh}(c\,x))\,\mathrm{arctanh}\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{3\,d^2\sqrt{-c^2\,d\,x^2+d}}+\frac{7\,b^2\,\mathrm{polylog}\left(2,-c\,x-\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{3\,d^2\sqrt{-c^2\,d\,x^2+d}}$$

$$-\frac{2\,\mathrm{I}\,b\,(a+b\,\mathrm{arccosh}(c\,x))\,\mathrm{polylog}\left(2,-\mathrm{I}\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{d^2\sqrt{-c^2\,d\,x^2+d}}$$

$$+\frac{2\,\mathrm{I}\,b\,(a+b\,\mathrm{arccosh}(c\,x))\,\mathrm{polylog}\left(2,\mathrm{I}\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{d^2\sqrt{-c^2\,d\,x^2+d}}$$

$$-\frac{7\,b^2\,\mathrm{polylog}\left(2,c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{3\,d^2\sqrt{-c^2\,d\,x^2+d}}+\frac{2\,\mathrm{I}\,b^2\,\mathrm{polylog}\left(3,-\mathrm{I}\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{d^2\sqrt{-c^2\,d\,x^2+d}}$$

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

Result(type 8, 29 leaves):

$$\int\frac{(a+b\,\mathrm{arccosh}(c\,x))^2}{x\,(-c^2\,d\,x^2+d)^{5/2}}\,dx$$

Problem 58: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\mathrm{arccosh}(c\,x))^2}{x^2\,(-c^2\,d\,x^2+d)^{5/2}}\,dx$$

Optimal(type 4, 470 leaves, 21 steps):

$$-\frac{(a+b\,\mathrm{arccosh}(c\,x))^2}{d\,x\,(-c^2\,d\,x^2+d)^{3/2}}+\frac{4\,c^2\,x\,(a+b\,\mathrm{arccosh}(c\,x))^2}{3\,d\,(-c^2\,d\,x^2+d)^{3/2}}-\frac{b^2\,c^2\,x}{3\,d^2\sqrt{-c^2\,d\,x^2+d}}+\frac{8\,c^2\,x\,(a+b\,\mathrm{arccosh}(c\,x))^2}{3\,d^2\sqrt{-c^2\,d\,x^2+d}}+\frac{b\,c\,(a+b\,\mathrm{arccosh}(c\,x))\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{3\,d^2\,(-c^2\,x^2+1)\sqrt{-c^2\,d\,x^2+d}}$$

$$+\frac{8\,c\,(a+b\,\mathrm{arccosh}(c\,x))^2\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{3\,d^2\sqrt{-c^2\,d\,x^2+d}}-\frac{4\,b\,c\,(a+b\,\mathrm{arccosh}(c\,x))\,\mathrm{arctanh}\left(\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)^2\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{d^2\sqrt{-c^2\,d\,x^2+d}}$$

$$-\frac{16\,b\,c\,(a+b\,\mathrm{arccosh}(c\,x))\ln\left(1-\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)^2\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{3\,d^2\sqrt{-c^2\,d\,x^2+d}}$$

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

Result(type ?, 3797 leaves): Display of huge result suppressed!

Problem 59: Result more than twice size of optimal antiderivative.

$$\int \frac{x^4 \operatorname{arccosh}(a x)^2}{\sqrt{-a^2 x^2+1}}\, dx$$

Optimal(type 3, 199 leaves, 11 steps):

$$\frac{15 \operatorname{arccosh}(a x) \sqrt{a x-1}}{64 a^5 \sqrt{-a x+1}}-\frac{3 x^2 \operatorname{arccosh}(a x) \sqrt{a x-1}}{8 a^3 \sqrt{-a x+1}}-\frac{x^4 \operatorname{arccosh}(a x) \sqrt{a x-1}}{8 a \sqrt{-a x+1}}+\frac{\operatorname{arccosh}(a x)^3 \sqrt{a x-1}}{8 a^5 \sqrt{-a x+1}}-\frac{15 x \sqrt{-a x+1}\, \sqrt{a x+1}}{64 a^4}$$
$$-\frac{x^3 \sqrt{-a x+1}\, \sqrt{a x+1}}{32 a^2}-\frac{3 x \operatorname{arccosh}(a x)^2 \sqrt{-a^2 x^2+1}}{8 a^4}-\frac{x^3 \operatorname{arccosh}(a x)^2 \sqrt{-a^2 x^2+1}}{4 a^2}$$

Result(type 3, 487 leaves):

$$-\frac{\sqrt{-a^2 x^2+1}\, \sqrt{a x-1}\, \sqrt{a x+1}\, \operatorname{arccosh}(a x)^3}{8 a^5 (a^2 x^2-1)}-\frac{1}{512 a^5 (a^2 x^2-1)}\Big(\sqrt{-a^2 x^2+1}\, \big(8 a^5 x^5-12 x^3 a^3+8 \sqrt{a x+1}\, \sqrt{a x-1}\, x^4 a^4+4 a x$$
$$-8 \sqrt{a x+1}\, \sqrt{a x-1}\, x^2 a^2+\sqrt{a x-1}\, \sqrt{a x+1}\big)\, \big(8 \operatorname{arccosh}(a x)^2-4 \operatorname{arccosh}(a x)+1\big)\Big)$$
$$-\frac{\sqrt{-a^2 x^2+1}\, \big(2 x^3 a^3-2 a x+2 \sqrt{a x+1}\, \sqrt{a x-1}\, x^2 a^2-\sqrt{a x-1}\, \sqrt{a x+1}\big)\, \big(2 \operatorname{arccosh}(a x)^2-2 \operatorname{arccosh}(a x)+1\big)}{16 a^5 (a^2 x^2-1)}$$
$$-\frac{\sqrt{-a^2 x^2+1}\, \big(2 x^3 a^3-2 a x-2 \sqrt{a x+1}\, \sqrt{a x-1}\, x^2 a^2+\sqrt{a x-1}\, \sqrt{a x+1}\big)\, \big(2 \operatorname{arccosh}(a x)^2+2 \operatorname{arccosh}(a x)+1\big)}{16 a^5 (a^2 x^2-1)}$$
$$-\frac{1}{512 a^5 (a^2 x^2-1)}\Big(\sqrt{-a^2 x^2+1}\, \big(8 a^5 x^5-12 x^3 a^3-8 \sqrt{a x+1}\, \sqrt{a x-1}\, x^4 a^4+4 a x+8 \sqrt{a x+1}\, \sqrt{a x-1}\, x^2 a^2$$
$$-\sqrt{a x-1}\, \sqrt{a x+1}\big)\, \big(8 \operatorname{arccosh}(a x)^2+4 \operatorname{arccosh}(a x)+1\big)\Big)$$

Problem 61: Unable to integrate problem.

$$\int \frac{\operatorname{arccosh}(a x)^2}{x \sqrt{-a^2 x^2+1}}\, dx$$

Optimal(type 4, 220 leaves, 8 steps):

$$\frac{2 \operatorname{arccosh}(a x)^2 \arctan\big(a x+\sqrt{a x-1}\, \sqrt{a x+1}\big) \sqrt{a x-1}}{\sqrt{-a x+1}}-\frac{2 I \operatorname{arccosh}(a x) \operatorname{polylog}\big(2, -I \big(a x+\sqrt{a x-1}\, \sqrt{a x+1}\big)\big) \sqrt{a x-1}}{\sqrt{-a x+1}}$$
$$+\frac{2 I \operatorname{arccosh}(a x) \operatorname{polylog}\big(2, I \big(a x+\sqrt{a x-1}\, \sqrt{a x+1}\big)\big) \sqrt{a x-1}}{\sqrt{-a x+1}}+\frac{2 I \operatorname{polylog}\big(3, -I \big(a x+\sqrt{a x-1}\, \sqrt{a x+1}\big)\big) \sqrt{a x-1}}{\sqrt{-a x+1}}$$
$$-\frac{2 I \operatorname{polylog}\big(3, I \big(a x+\sqrt{a x-1}\, \sqrt{a x+1}\big)\big) \sqrt{a x-1}}{\sqrt{-a x+1}}$$

Result(type 8, 24 leaves):

$$\int \frac{\operatorname{arccosh}(a x)^2}{x\sqrt{-a^2 x^2+1}}\, dx$$

```
Problem 63: Unable to integrate problem.
```

$$\int (f x)^m \left(-c^2 d x^2+d\right) \left(a+b \operatorname{arccosh}(c x)\right)^2 dx$$

```
Optimal(type 1, 1 leaves, 1 step):
```

$$0$$

```
Result(type 8, 29 leaves):
```

$$\int (f x)^m \left(-c^2 d x^2+d\right) \left(a+b \operatorname{arccosh}(c x)\right)^2 dx$$

```
Problem 74: Result more than twice size of optimal antiderivative.
```

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

```
Optimal(type 4, 349 leaves, 15 steps):
```

$$-\frac{3 \operatorname{Chi}\left(\frac{a+b \operatorname{arccosh}(c x)}{b}\right) \cosh\left(\frac{a}{b}\right) \sqrt{-c x+1}}{64 b c^4 \sqrt{c x-1}}+\frac{3 \operatorname{Chi}\left(\frac{3 (a+b \operatorname{arccosh}(c x))}{b}\right) \cosh\left(\frac{3 a}{b}\right) \sqrt{-c x+1}}{64 b c^4 \sqrt{c x-1}}$$
$$+\frac{\operatorname{Chi}\left(\frac{5 (a+b \operatorname{arccosh}(c x))}{b}\right) \cosh\left(\frac{5 a}{b}\right) \sqrt{-c x+1}}{64 b c^4 \sqrt{c x-1}}-\frac{\operatorname{Chi}\left(\frac{7 (a+b \operatorname{arccosh}(c x))}{b}\right) \cosh\left(\frac{7 a}{b}\right) \sqrt{-c x+1}}{64 b c^4 \sqrt{c x-1}}$$
$$+\frac{3 \operatorname{Shi}\left(\frac{a+b \operatorname{arccosh}(c x)}{b}\right) \sinh\left(\frac{a}{b}\right) \sqrt{-c x+1}}{64 b c^4 \sqrt{c x-1}}-\frac{3 \operatorname{Shi}\left(\frac{3 (a+b \operatorname{arccosh}(c x))}{b}\right) \sinh\left(\frac{3 a}{b}\right) \sqrt{-c x+1}}{64 b c^4 \sqrt{c x-1}}$$
$$-\frac{\operatorname{Shi}\left(\frac{5 (a+b \operatorname{arccosh}(c x))}{b}\right) \sinh\left(\frac{5 a}{b}\right) \sqrt{-c x+1}}{64 b c^4 \sqrt{c x-1}}+\frac{\operatorname{Shi}\left(\frac{7 (a+b \operatorname{arccosh}(c x))}{b}\right) \sinh\left(\frac{7 a}{b}\right) \sqrt{-c x+1}}{64 b c^4 \sqrt{c x-1}}$$

```
Result(type 4, 724 leaves):
```

$$-\frac{\sqrt{-c^2 x^2+1}\left(-\sqrt{c x-1}\,\sqrt{c x+1}\, x c+c^2 x^2-1\right) \operatorname{Ei}_1\left(7 \operatorname{arccosh}(c x)+\frac{7 a}{b}\right) e^{\frac{b \operatorname{arccosh}(c x)+7 a}{b}}}{128 (c x+1) c^4 (c x-1) b}$$
$$-\frac{\sqrt{-c^2 x^2+1}\left(-\sqrt{c x-1}\,\sqrt{c x+1}\, x c+c^2 x^2-1\right) \operatorname{Ei}_1\left(-7 \operatorname{arccosh}(c x)-\frac{7 a}{b}\right) e^{\frac{b \operatorname{arccosh}(c x)-7 a}{b}}}{128 (c x+1) c^4 (c x-1) b}$$

$$+\frac{\sqrt{-c^2x^2+1}\left(-\sqrt{cx-1}\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(5\operatorname{arccosh}(cx)+\frac{5a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(cx)+5a}{b}}}{128\,(cx+1)\,c^4\,(cx-1)\,b}$$

$$+\frac{3\sqrt{-c^2x^2+1}\left(-\sqrt{cx-1}\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(3\operatorname{arccosh}(cx)+\frac{3a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(cx)+3a}{b}}}{128\,(cx+1)\,c^4\,(cx-1)\,b}$$

$$-\frac{3\sqrt{-c^2x^2+1}\left(-\sqrt{cx-1}\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(\operatorname{arccosh}(cx)+\frac{a}{b}\right)\mathrm{e}^{\frac{a+b\operatorname{arccosh}(cx)}{b}}}{128\,(cx+1)\,c^4\,(cx-1)\,b}$$

$$-\frac{3\sqrt{-c^2x^2+1}\left(-\sqrt{cx-1}\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(-\operatorname{arccosh}(cx)-\frac{a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(cx)-a}{b}}}{128\,(cx+1)\,c^4\,(cx-1)\,b}$$

$$+\frac{3\sqrt{-c^2x^2+1}\left(-\sqrt{cx-1}\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(-3\operatorname{arccosh}(cx)-\frac{3a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(cx)-3a}{b}}}{128\,(cx+1)\,c^4\,(cx-1)\,b}$$

$$+\frac{\sqrt{-c^2x^2+1}\left(-\sqrt{cx-1}\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(-5\operatorname{arccosh}(cx)-\frac{5a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(cx)-5a}{b}}}{128\,(cx+1)\,c^4\,(cx-1)\,b}$$

Problem 79: Result more than twice size of optimal antiderivative.

$$\int\frac{x^3}{\operatorname{arccosh}(ax)\sqrt{-a^2x^2+1}}\,dx$$

Optimal(type 4, 53 leaves, 5 steps):

$$\frac{3\,\mathrm{Chi}(\operatorname{arccosh}(ax))\sqrt{ax-1}}{4a^4\sqrt{-ax+1}}+\frac{\mathrm{Chi}(3\operatorname{arccosh}(ax))\sqrt{ax-1}}{4a^4\sqrt{-ax+1}}$$

Result(type 4, 199 leaves):

$$\frac{\sqrt{-a^2x^2+1}\sqrt{ax-1}\sqrt{ax+1}\,\mathrm{Ei}_1(3\operatorname{arccosh}(ax))}{8a^4\left(a^2x^2-1\right)}+\frac{\sqrt{-a^2x^2+1}\sqrt{ax-1}\sqrt{ax+1}\,\mathrm{Ei}_1(-3\operatorname{arccosh}(ax))}{8a^4\left(a^2x^2-1\right)}$$
$$+\frac{3\sqrt{-a^2x^2+1}\sqrt{ax-1}\sqrt{ax+1}\,\mathrm{Ei}_1(\operatorname{arccosh}(ax))}{8a^4\left(a^2x^2-1\right)}+\frac{3\sqrt{-a^2x^2+1}\sqrt{ax-1}\sqrt{ax+1}\,\mathrm{Ei}_1(-\operatorname{arccosh}(ax))}{8a^4\left(a^2x^2-1\right)}$$

Problem 86: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2 (-c^2 x^2+1)^{3/2}}{(a+b\,\mathrm{arccosh}(cx))^2}\, dx$$

Optimal(type 4, 312 leaves, 21 steps):

$$\frac{\cosh\left(\frac{2a}{b}\right)\mathrm{Shi}\left(\frac{2(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{16\,b^2 c^3\sqrt{cx-1}}+\frac{\cosh\left(\frac{4a}{b}\right)\mathrm{Shi}\left(\frac{4(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{4\,b^2 c^3\sqrt{cx-1}}$$
$$-\frac{3\cosh\left(\frac{6a}{b}\right)\mathrm{Shi}\left(\frac{6(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{16\,b^2 c^3\sqrt{cx-1}}-\frac{\mathrm{Chi}\left(\frac{2(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{2a}{b}\right)\sqrt{-cx+1}}{16\,b^2 c^3\sqrt{cx-1}}$$
$$-\frac{\mathrm{Chi}\left(\frac{4(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{4a}{b}\right)\sqrt{-cx+1}}{4\,b^2 c^3\sqrt{cx-1}}+\frac{3\,\mathrm{Chi}\left(\frac{6(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{6a}{b}\right)\sqrt{-cx+1}}{16\,b^2 c^3\sqrt{cx-1}}$$
$$-\frac{x^2(-c^2x^2+1)^{3/2}\sqrt{cx-1}\,\sqrt{cx+1}}{b\,c\,(a+b\,\mathrm{arccosh}(cx))}$$

Result(type 4, 1175 leaves):

$$-\frac{1}{64\,(cx+1)\,c^3\,(cx-1)\,(a+b\,\mathrm{arccosh}(cx))\,b}\Big(\sqrt{-c^2x^2+1}\,\big(-32\sqrt{cx+1}\,\sqrt{cx-1}\,x^6c^6+32c^7x^7+48\sqrt{cx+1}\,\sqrt{cx-1}\,x^4c^4-64c^5x^5$$
$$-18\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2+38c^3x^3+\sqrt{cx-1}\,\sqrt{cx+1}-6cx\big)\Big)$$
$$+\frac{3\sqrt{-c^2x^2+1}\,\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(6\,\mathrm{arccosh}(cx)+\frac{6a}{b}\right)\mathrm{e}^{\frac{b\,\mathrm{arccosh}(cx)+6a}{b}}}{32\,(cx+1)\,c^3\,(cx-1)\,b^2}$$
$$+\frac{1}{64\sqrt{cx-1}\,\sqrt{cx+1}\,c^3\,b^2\,(a+b\,\mathrm{arccosh}(cx))}\Big(\sqrt{-c^2x^2+1}\,\Big(32\sqrt{cx-1}\,\sqrt{cx+1}\,x^5bc^5+32x^6bc^6-32b\sqrt{cx-1}\,\sqrt{cx+1}\,c^3x^3-48x^4bc^4$$
$$+6b\sqrt{cx-1}\,\sqrt{cx+1}\,cx+18x^2bc^2+6\,\mathrm{arccosh}(cx)\,\mathrm{e}^{-\frac{6a}{b}}\,\mathrm{Ei}_1\left(-6\,\mathrm{arccosh}(cx)-\frac{6a}{b}\right)b+6\,\mathrm{e}^{-\frac{6a}{b}}\,\mathrm{Ei}_1\left(-6\,\mathrm{arccosh}(cx)-\frac{6a}{b}\right)a-b\Big)\Big)$$
$$+\frac{\sqrt{-c^2x^2+1}}{16\sqrt{cx-1}\,\sqrt{cx+1}\,c^3\,(a+b\,\mathrm{arccosh}(cx))\,b}$$
$$+\frac{\sqrt{-c^2x^2+1}\,\left(-8\sqrt{cx+1}\,\sqrt{cx-1}\,x^4c^4+8c^5x^5+8\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2-12c^3x^3-\sqrt{cx-1}\,\sqrt{cx+1}+4cx\right)}{32\,(cx+1)\,c^3\,(cx-1)\,(a+b\,\mathrm{arccosh}(cx))\,b}$$
$$-\frac{\sqrt{-c^2x^2+1}\,\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(4\,\mathrm{arccosh}(cx)+\frac{4a}{b}\right)\mathrm{e}^{\frac{b\,\mathrm{arccosh}(cx)+4a}{b}}}{8\,(cx+1)\,c^3\,(cx-1)\,b^2}$$
$$+\frac{\sqrt{-c^2x^2+1}\,\left(-2\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2+2c^3x^3+\sqrt{cx-1}\,\sqrt{cx+1}-2cx\right)}{64\,(cx+1)\,c^3\,(cx-1)\,(a+b\,\mathrm{arccosh}(cx))\,b}$$

$$-\frac{\sqrt{-c^2x^2+1}\,\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(2\operatorname{arccosh}(cx)+\frac{2a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(cx)+2a}{b}}}{32\,(cx+1)\,c^3\,(cx-1)\,b^2}$$

$$-\frac{1}{64\sqrt{cx-1}\,\sqrt{cx+1}\,c^3\,b^2\,(a+b\operatorname{arccosh}(cx))}\left(\sqrt{-c^2x^2+1}\left(2b\sqrt{cx-1}\,\sqrt{cx+1}\,cx+2x^2bc^2+2\operatorname{arccosh}(cx)\,\mathrm{Ei}_1\left(-2\operatorname{arccosh}(cx)\right.\right.\right.$$
$$\left.\left.\left.-\frac{2a}{b}\right)\mathrm{e}^{-\frac{2a}{b}}\,b+2\,\mathrm{Ei}_1\left(-2\operatorname{arccosh}(cx)-\frac{2a}{b}\right)\mathrm{e}^{-\frac{2a}{b}}\,a-b\right)\right)$$

$$-\frac{1}{32\sqrt{cx-1}\,\sqrt{cx+1}\,c^3\,b^2\,(a+b\operatorname{arccosh}(cx))}\left(\sqrt{-c^2x^2+1}\left(8b\sqrt{cx-1}\,\sqrt{cx+1}\,c^3x^3+8x^4bc^4-4b\sqrt{cx-1}\,\sqrt{cx+1}\,cx-8x^2bc^2\right.\right.$$
$$\left.\left.+4\,\mathrm{e}^{-\frac{4a}{b}}\operatorname{arccosh}(cx)\,\mathrm{Ei}_1\left(-4\operatorname{arccosh}(cx)-\frac{4a}{b}\right)b+4\,\mathrm{e}^{-\frac{4a}{b}}\,\mathrm{Ei}_1\left(-4\operatorname{arccosh}(cx)-\frac{4a}{b}\right)a+b\right)\right)$$

Problem 87: Result more than twice size of optimal antiderivative.

$$\int\frac{(-c^2x^2+1)^{3/2}}{(a+b\operatorname{arccosh}(cx))^2}\,dx$$

Optimal(type 4, 220 leaves, 11 steps):

$$\frac{\cosh\left(\frac{2a}{b}\right)\mathrm{Shi}\left(\frac{2(a+b\operatorname{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{b^2c\sqrt{cx-1}}-\frac{\cosh\left(\frac{4a}{b}\right)\mathrm{Shi}\left(\frac{4(a+b\operatorname{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{2b^2c\sqrt{cx-1}}$$
$$-\frac{\mathrm{Chi}\left(\frac{2(a+b\operatorname{arccosh}(cx))}{b}\right)\sinh\left(\frac{2a}{b}\right)\sqrt{-cx+1}}{b^2c\sqrt{cx-1}}+\frac{\mathrm{Chi}\left(\frac{4(a+b\operatorname{arccosh}(cx))}{b}\right)\sinh\left(\frac{4a}{b}\right)\sqrt{-cx+1}}{2b^2c\sqrt{cx-1}}$$
$$-\frac{(-c^2x^2+1)^{3/2}\sqrt{cx-1}\,\sqrt{cx+1}}{bc\,(a+b\operatorname{arccosh}(cx))}$$

Result(type 4, 736 leaves):

$$-\frac{\sqrt{-c^2x^2+1}\left(-8\sqrt{cx+1}\,\sqrt{cx-1}\,x^4c^4+8c^5x^5+8\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2-12c^3x^3-\sqrt{cx-1}\,\sqrt{cx+1}+4cx\right)}{16\,(cx+1)\,c\,(cx-1)\,b\,(a+b\operatorname{arccosh}(cx))}$$

$$+\frac{\sqrt{-c^2x^2+1}\,\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(4\operatorname{arccosh}(cx)+\frac{4a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(cx)+4a}{b}}}{4\,(cx+1)\,c\,(cx-1)\,b^2}$$

$$+\frac{1}{16\sqrt{cx-1}\,\sqrt{cx+1}\,cb^2\,(a+b\operatorname{arccosh}(cx))}\left(\sqrt{-c^2x^2+1}\left(8b\sqrt{cx-1}\,\sqrt{cx+1}\,c^3x^3+8x^4bc^4-4b\sqrt{cx-1}\,\sqrt{cx+1}\,cx-8x^2bc^2\right.\right.$$

$$+4\,e^{-\frac{4a}{b}}\,\mathrm{arccosh}(cx)\,\mathrm{Ei}_1\left(-4\,\mathrm{arccosh}(cx)-\frac{4a}{b}\right)b+4\,e^{-\frac{4a}{b}}\,\mathrm{Ei}_1\left(-4\,\mathrm{arccosh}(cx)-\frac{4a}{b}\right)a+b\Bigg)\Bigg)+\frac{3\sqrt{-c^2x^2+1}}{8\sqrt{cx-1}\,\sqrt{cx+1}\,cb\,(a+b\,\mathrm{arccosh}(cx))}$$

$$+\frac{\sqrt{-c^2x^2+1}\,\left(-2\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2+2c^3x^3+\sqrt{cx-1}\,\sqrt{cx+1}-2cx\right)}{4\,(cx+1)\,c\,(cx-1)\,b\,(a+b\,\mathrm{arccosh}(cx))}$$

$$-\frac{\sqrt{-c^2x^2+1}\,\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(2\,\mathrm{arccosh}(cx)+\frac{2a}{b}\right)e^{\frac{b\,\mathrm{arccosh}(cx)+2a}{b}}}{2\,(cx+1)\,c\,(cx-1)\,b^2}$$

$$-\frac{1}{4\sqrt{cx-1}\,\sqrt{cx+1}\,cb^2\,(a+b\,\mathrm{arccosh}(cx))}\Bigg(\sqrt{-c^2x^2+1}\,\Bigg(2b\sqrt{cx-1}\,\sqrt{cx+1}\,cx+2x^2bc^2+2\,\mathrm{arccosh}(cx)\,\mathrm{Ei}_1\Bigg(-2\,\mathrm{arccosh}(cx)$$

$$-\frac{2a}{b}\Bigg)e^{-\frac{2a}{b}}\,b+2\,\mathrm{Ei}_1\left(-2\,\mathrm{arccosh}(cx)-\frac{2a}{b}\right)e^{-\frac{2a}{b}}\,a-b\Bigg)\Bigg)$$

```
Problem 90: Result more than twice size of optimal antiderivative.
```

$$\int\frac{x^2\,(-c^2x^2+1)^{5/2}}{(a+b\,\mathrm{arccosh}(cx))^2}\,dx$$

```
Optimal(type 4, 400 leaves, 30 steps):
```

$$\frac{\cosh\left(\frac{2a}{b}\right)\mathrm{Shi}\left(\frac{2\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{16\,b^2c^3\sqrt{cx-1}}+\frac{\cosh\left(\frac{4a}{b}\right)\mathrm{Shi}\left(\frac{4\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{8\,b^2c^3\sqrt{cx-1}}$$

$$-\frac{3\cosh\left(\frac{6a}{b}\right)\mathrm{Shi}\left(\frac{6\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{16\,b^2c^3\sqrt{cx-1}}+\frac{\cosh\left(\frac{8a}{b}\right)\mathrm{Shi}\left(\frac{8\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{16\,b^2c^3\sqrt{cx-1}}$$

$$-\frac{\mathrm{Chi}\left(\frac{2\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{2a}{b}\right)\sqrt{-cx+1}}{16\,b^2c^3\sqrt{cx-1}}-\frac{\mathrm{Chi}\left(\frac{4\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{4a}{b}\right)\sqrt{-cx+1}}{8\,b^2c^3\sqrt{cx-1}}$$

$$+\frac{3\,\mathrm{Chi}\left(\frac{6\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{6a}{b}\right)\sqrt{-cx+1}}{16\,b^2c^3\sqrt{cx-1}}-\frac{\mathrm{Chi}\left(\frac{8\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{8a}{b}\right)\sqrt{-cx+1}}{16\,b^2c^3\sqrt{cx-1}}$$

$$-\frac{x^2\,(-c^2x^2+1)^{5/2}\sqrt{cx-1}\,\sqrt{cx+1}}{bc\,(a+b\,\mathrm{arccosh}(cx))}$$

```
Result(type 4, 1675 leaves):
```

$$\frac{1}{256\,(cx+1)\,c^3\,(cx-1)\,b\,(a+b\,\mathrm{arccosh}(cx))}\Big(\sqrt{-c^2x^2+1}\,\big(-128\sqrt{cx+1}\,\sqrt{cx-1}\,x^8c^8+128c^9x^9+256\sqrt{cx+1}\,\sqrt{cx-1}\,x^6c^6-320c^7x^7$$

$$-160\sqrt{cx+1}\,\sqrt{cx-1}\,x^4c^4+272c^5x^5+32\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2-88c^3x^3-\sqrt{cx-1}\,\sqrt{cx+1}+8cx\big)\Big)$$

$$-\frac{\sqrt{-c^2 x^2+1}\,\left(-\sqrt{c x-1}\,\sqrt{c x+1}\,x c+c^2 x^2-1\right)\mathrm{Ei}_1\!\left(8\operatorname{arccosh}(c x)+\frac{8 a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(c x)+8 a}{b}}}{32 b^2 (c x+1) c^3 (c x-1)}$$

$$-\frac{1}{256\sqrt{c x-1}\,\sqrt{c x+1}\,c^3 b^2 (a+b\operatorname{arccosh}(c x))}\left(\sqrt{-c^2 x^2+1}\,\left(128\sqrt{c x-1}\,\sqrt{c x+1}\,x^7 b c^7+128 x^8 b c^8-192\sqrt{c x-1}\,\sqrt{c x+1}\,x^5 b c^5\right.\right.$$

$$-256 x^6 b c^6+80 b\sqrt{c x-1}\,\sqrt{c x+1}\,c^3 x^3+160 x^4 b c^4-8 b\sqrt{c x-1}\,\sqrt{c x+1}\,c x-32 x^2 b c^2+8\operatorname{arccosh}(c x)\,\mathrm{Ei}_1\!\left(-8\operatorname{arccosh}(c x)-\frac{8 a}{b}\right)\mathrm{e}^{-\frac{8 a}{b}}\,b$$

$$\left.\left.+8\,\mathrm{Ei}_1\!\left(-8\operatorname{arccosh}(c x)-\frac{8 a}{b}\right)\mathrm{e}^{-\frac{8 a}{b}}\,a+b\right)\right)+\frac{5\sqrt{-c^2 x^2+1}}{128\sqrt{c x-1}\,\sqrt{c x+1}\,c^3 (a+b\operatorname{arccosh}(c x))\,b}$$

$$-\frac{1}{64 (c x+1) c^3 (c x-1) (a+b\operatorname{arccosh}(c x))\,b}\left(\sqrt{-c^2 x^2+1}\,\left(-32\sqrt{c x+1}\,\sqrt{c x-1}\,x^6 c^6+32 c^7 x^7+48\sqrt{c x+1}\,\sqrt{c x-1}\,x^4 c^4-64 c^5 x^5\right.\right.$$

$$\left.\left.-18\sqrt{c x+1}\,\sqrt{c x-1}\,x^2 c^2+38 c^3 x^3+\sqrt{c x-1}\,\sqrt{c x+1}-6 c x\right)\right)$$

$$+\frac{3\sqrt{-c^2 x^2+1}\,\left(-\sqrt{c x-1}\,\sqrt{c x+1}\,x c+c^2 x^2-1\right)\mathrm{Ei}_1\!\left(6\operatorname{arccosh}(c x)+\frac{6 a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(c x)+6 a}{b}}}{32 (c x+1) c^3 (c x-1) b^2}$$

$$+\frac{\sqrt{-c^2 x^2+1}\,\left(-8\sqrt{c x+1}\,\sqrt{c x-1}\,x^4 c^4+8 c^5 x^5+8\sqrt{c x+1}\,\sqrt{c x-1}\,x^2 c^2-12 c^3 x^3-\sqrt{c x-1}\,\sqrt{c x+1}+4 c x\right)}{64 (c x+1) c^3 (c x-1) (a+b\operatorname{arccosh}(c x))\,b}$$

$$-\frac{\sqrt{-c^2 x^2+1}\,\left(-\sqrt{c x-1}\,\sqrt{c x+1}\,x c+c^2 x^2-1\right)\mathrm{Ei}_1\!\left(4\operatorname{arccosh}(c x)+\frac{4 a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(c x)+4 a}{b}}}{16 (c x+1) c^3 (c x-1) b^2}$$

$$+\frac{\sqrt{-c^2 x^2+1}\,\left(-2\sqrt{c x+1}\,\sqrt{c x-1}\,x^2 c^2+2 c^3 x^3+\sqrt{c x-1}\,\sqrt{c x+1}-2 c x\right)}{64 (c x+1) c^3 (c x-1) (a+b\operatorname{arccosh}(c x))\,b}$$

$$-\frac{\sqrt{-c^2 x^2+1}\,\left(-\sqrt{c x-1}\,\sqrt{c x+1}\,x c+c^2 x^2-1\right)\mathrm{Ei}_1\!\left(2\operatorname{arccosh}(c x)+\frac{2 a}{b}\right)\mathrm{e}^{\frac{b\operatorname{arccosh}(c x)+2 a}{b}}}{32 (c x+1) c^3 (c x-1) b^2}$$

$$-\frac{1}{64\sqrt{c x-1}\,\sqrt{c x+1}\,c^3 b^2 (a+b\operatorname{arccosh}(c x))}\left(\sqrt{-c^2 x^2+1}\,\left(2 b\sqrt{c x-1}\,\sqrt{c x+1}\,c x+2 x^2 b c^2+2\operatorname{arccosh}(c x)\,\mathrm{Ei}_1\!\left(-2\operatorname{arccosh}(c x)\right.\right.\right.$$

$$\left.\left.\left.-\frac{2 a}{b}\right)\mathrm{e}^{-\frac{2 a}{b}}\,b+2\,\mathrm{Ei}_1\!\left(-2\operatorname{arccosh}(c x)-\frac{2 a}{b}\right)\mathrm{e}^{-\frac{2 a}{b}}\,a-b\right)\right)$$

$$-\frac{1}{64\sqrt{c x-1}\,\sqrt{c x+1}\,c^3 b^2 (a+b\operatorname{arccosh}(c x))}\left(\sqrt{-c^2 x^2+1}\,\left(8 b\sqrt{c x-1}\,\sqrt{c x+1}\,c^3 x^3+8 x^4 b c^4-4 b\sqrt{c x-1}\,\sqrt{c x+1}\,c x-8 x^2 b c^2\right.\right.$$

$$+ 4 e^{-\frac{4a}{b}} \operatorname{arccosh}(cx) \operatorname{Ei}_1\left(-4\operatorname{arccosh}(cx) - \frac{4a}{b}\right) b + 4 e^{-\frac{4a}{b}} \operatorname{Ei}_1\left(-4\operatorname{arccosh}(cx) - \frac{4a}{b}\right) a + b\Big)\Big)$$

$$+ \frac{1}{64\sqrt{cx-1}\,\sqrt{cx+1}\,c^3 b^2 (a + b\operatorname{arccosh}(cx))}\Big(\sqrt{-c^2x^2+1}\,\Big(32\sqrt{cx-1}\,\sqrt{cx+1}\,x^5 b c^5 + 32 x^6 b c^6 - 32 b\sqrt{cx-1}\,\sqrt{cx+1}\,c^3x^3 - 48x^4 b c^4$$

$$+ 6b\sqrt{cx-1}\,\sqrt{cx+1}\,cx + 18x^2 b c^2 + 6\operatorname{arccosh}(cx)\, e^{-\frac{6a}{b}} \operatorname{Ei}_1\left(-6\operatorname{arccosh}(cx) - \frac{6a}{b}\right) b + 6 e^{-\frac{6a}{b}} \operatorname{Ei}_1\left(-6\operatorname{arccosh}(cx) - \frac{6a}{b}\right) a - b\Big)\Big)$$

```
Problem 91: Result more than twice size of optimal antiderivative.
```

$$\int \frac{(-c^2x^2+1)^{5/2}}{(a+b\operatorname{arccosh}(cx))^2}\, dx$$

```
Optimal(type 4, 309 leaves, 14 steps):
```

$$\frac{15\cosh\left(\frac{2a}{b}\right)\operatorname{Shi}\left(\frac{2(a+b\operatorname{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{16b^2c\sqrt{cx-1}} - \frac{3\cosh\left(\frac{4a}{b}\right)\operatorname{Shi}\left(\frac{4(a+b\operatorname{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{4b^2c\sqrt{cx-1}}$$

$$+ \frac{3\cosh\left(\frac{6a}{b}\right)\operatorname{Shi}\left(\frac{6(a+b\operatorname{arccosh}(cx))}{b}\right)\sqrt{-cx+1}}{16b^2c\sqrt{cx-1}} - \frac{15\operatorname{Chi}\left(\frac{2(a+b\operatorname{arccosh}(cx))}{b}\right)\sinh\left(\frac{2a}{b}\right)\sqrt{-cx+1}}{16b^2c\sqrt{cx-1}}$$

$$+ \frac{3\operatorname{Chi}\left(\frac{4(a+b\operatorname{arccosh}(cx))}{b}\right)\sinh\left(\frac{4a}{b}\right)\sqrt{-cx+1}}{4b^2c\sqrt{cx-1}} - \frac{3\operatorname{Chi}\left(\frac{6(a+b\operatorname{arccosh}(cx))}{b}\right)\sinh\left(\frac{6a}{b}\right)\sqrt{-cx+1}}{16b^2c\sqrt{cx-1}}$$

$$- \frac{(-c^2x^2+1)^{5/2}\sqrt{cx-1}\,\sqrt{cx+1}}{bc(a+b\operatorname{arccosh}(cx))}$$

```
Result(type 4, 1175 leaves):
```

$$\frac{1}{64(cx+1)c(cx-1)b(a+b\operatorname{arccosh}(cx))}\Big(\sqrt{-c^2x^2+1}\,\big(-32\sqrt{cx+1}\,\sqrt{cx-1}\,x^6c^6 + 32c^7x^7 + 48\sqrt{cx+1}\,\sqrt{cx-1}\,x^4c^4 - 64c^5x^5$$

$$- 18\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2 + 38c^3x^3 + \sqrt{cx-1}\,\sqrt{cx+1} - 6cx\big)\Big)$$

$$- \frac{3\sqrt{-c^2x^2+1}\,\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc + c^2x^2 - 1\right)\operatorname{Ei}_1\left(6\operatorname{arccosh}(cx) + \frac{6a}{b}\right) e^{\frac{b\operatorname{arccosh}(cx)+6a}{b}}}{32(cx+1)c(cx-1)b^2}$$

$$- \frac{1}{64\sqrt{cx-1}\,\sqrt{cx+1}\,cb^2(a+b\operatorname{arccosh}(cx))}\Big(\sqrt{-c^2x^2+1}\,\Big(32\sqrt{cx-1}\,\sqrt{cx+1}\,x^5bc^5 + 32x^6bc^6 - 32b\sqrt{cx-1}\,\sqrt{cx+1}\,c^3x^3 - 48x^4bc^4$$

$$+ 6b\sqrt{cx-1}\,\sqrt{cx+1}\,cx + 18x^2bc^2 + 6\operatorname{arccosh}(cx)\, e^{-\frac{6a}{b}} \operatorname{Ei}_1\left(-6\operatorname{arccosh}(cx) - \frac{6a}{b}\right) b + 6 e^{-\frac{6a}{b}} \operatorname{Ei}_1\left(-6\operatorname{arccosh}(cx) - \frac{6a}{b}\right) a - b\Big)\Big)$$

$$+\frac{5\sqrt{-c^2x^2+1}}{16\sqrt{cx-1}\,\sqrt{cx+1}\,c\,b\,(a+b\,\mathrm{arccosh}(cx))}$$

$$-\frac{3\sqrt{-c^2x^2+1}\,\left(-8\sqrt{cx+1}\,\sqrt{cx-1}\,x^4c^4+8c^5x^5+8\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2-12c^3x^3-\sqrt{cx-1}\,\sqrt{cx+1}+4cx\right)}{32\,(cx+1)\,c\,(cx-1)\,b\,(a+b\,\mathrm{arccosh}(cx))}$$

$$+\frac{3\sqrt{-c^2x^2+1}\,\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(4\,\mathrm{arccosh}(cx)+\frac{4a}{b}\right)\mathrm{e}^{\frac{b\,\mathrm{arccosh}(cx)+4a}{b}}}{8\,(cx+1)\,c\,(cx-1)\,b^2}$$

$$+\frac{15\sqrt{-c^2x^2+1}\,\left(-2\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2+2c^3x^3+\sqrt{cx-1}\,\sqrt{cx+1}-2cx\right)}{64\,(cx+1)\,c\,(cx-1)\,b\,(a+b\,\mathrm{arccosh}(cx))}$$

$$-\frac{15\sqrt{-c^2x^2+1}\,\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\mathrm{Ei}_1\left(2\,\mathrm{arccosh}(cx)+\frac{2a}{b}\right)\mathrm{e}^{\frac{b\,\mathrm{arccosh}(cx)+2a}{b}}}{32\,(cx+1)\,c\,(cx-1)\,b^2}$$

$$-\frac{1}{64\sqrt{cx-1}\,\sqrt{cx+1}\,c\,b^2\,(a+b\,\mathrm{arccosh}(cx))}\left(15\sqrt{-c^2x^2+1}\,\left(2b\sqrt{cx-1}\,\sqrt{cx+1}\,cx+2x^2bc^2+2\,\mathrm{arccosh}(cx)\,\mathrm{Ei}_1\left(-2\,\mathrm{arccosh}(cx)\right.\right.\right.$$
$$\left.\left.\left.-\frac{2a}{b}\right)\mathrm{e}^{-\frac{2a}{b}}\,b+2\,\mathrm{Ei}_1\left(-2\,\mathrm{arccosh}(cx)-\frac{2a}{b}\right)\mathrm{e}^{-\frac{2a}{b}}\,a-b\right)\right)$$

$$+\frac{1}{32\sqrt{cx-1}\,\sqrt{cx+1}\,c\,b^2\,(a+b\,\mathrm{arccosh}(cx))}\left(3\sqrt{-c^2x^2+1}\,\left(8b\sqrt{cx-1}\,\sqrt{cx+1}\,c^3x^3+8x^4bc^4-4b\sqrt{cx-1}\,\sqrt{cx+1}\,cx-8x^2bc^2\right.\right.$$
$$\left.\left.+4\,\mathrm{e}^{-\frac{4a}{b}}\,\mathrm{arccosh}(cx)\,\mathrm{Ei}_1\left(-4\,\mathrm{arccosh}(cx)-\frac{4a}{b}\right)b+4\,\mathrm{e}^{-\frac{4a}{b}}\,\mathrm{Ei}_1\left(-4\,\mathrm{arccosh}(cx)-\frac{4a}{b}\right)a+b\right)\right)$$

```
Problem 93: Result more than twice size of optimal antiderivative.
```

$$\int \frac{x^4}{(a+b\,\mathrm{arccosh}(cx))^2\sqrt{-c^2x^2+1}}\,dx$$

```
Optimal(type 4, 212 leaves, 10 steps):
```

$$-\frac{x^4\sqrt{cx-1}}{b\,c\,(a+b\,\mathrm{arccosh}(cx))\sqrt{-cx+1}}+\frac{\cosh\left(\frac{2a}{b}\right)\mathrm{Shi}\left(\frac{2(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{cx-1}}{b^2c^5\sqrt{-cx+1}}+\frac{\cosh\left(\frac{4a}{b}\right)\mathrm{Shi}\left(\frac{4(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{cx-1}}{2b^2c^5\sqrt{-cx+1}}$$
$$-\frac{\mathrm{Chi}\left(\frac{2(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{2a}{b}\right)\sqrt{cx-1}}{b^2c^5\sqrt{-cx+1}}-\frac{\mathrm{Chi}\left(\frac{4(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{4a}{b}\right)\sqrt{cx-1}}{2b^2c^5\sqrt{-cx+1}}$$

```
Result(type 4, 757 leaves):
```

$$-\frac{\sqrt{-c^2x^2+1}\,\left(-8\sqrt{cx+1}\,\sqrt{cx-1}\,x^4c^4+8c^5x^5+8\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2-12c^3x^3-\sqrt{cx-1}\,\sqrt{cx+1}+4cx\right)}{16\,(c^2x^2-1)\,c^5 b\,(a+b\,\mathrm{arccosh}(cx))}$$

$$-\frac{\left(\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\sqrt{-c^2x^2+1}\,\mathrm{Ei}_1\left(4\,\mathrm{arccosh}(cx)+\frac{4a}{b}\right)\mathrm{e}^{-\frac{b\,\mathrm{arccosh}(cx)-4a}{b}}}{4c^5\,(c^2x^2-1)\,b^2}$$

$$+\frac{1}{16\,(c^2x^2-1)\,c^5b^2\,(a+b\,\mathrm{arccosh}(cx))}\left(\sqrt{-c^2x^2+1}\,\sqrt{cx-1}\,\sqrt{cx+1}\,\left(8b\sqrt{cx-1}\,\sqrt{cx+1}\,c^3x^3+8x^4bc^4-4b\sqrt{cx-1}\,\sqrt{cx+1}\,cx\right.\right.$$

$$\left.\left.-8x^2bc^2+4\,\mathrm{e}^{-\frac{4a}{b}}\,\mathrm{arccosh}(cx)\,\mathrm{Ei}_1\left(-4\,\mathrm{arccosh}(cx)-\frac{4a}{b}\right)b+4\,\mathrm{e}^{-\frac{4a}{b}}\,\mathrm{Ei}_1\left(-4\,\mathrm{arccosh}(cx)-\frac{4a}{b}\right)a+b\right)\right)$$

$$+\frac{3\sqrt{-c^2x^2+1}\,\sqrt{cx-1}\,\sqrt{cx+1}}{8\,(c^2x^2-1)\,c^5b\,(a+b\,\mathrm{arccosh}(cx))}-\frac{\sqrt{-c^2x^2+1}\,\left(-2\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2+2c^3x^3+\sqrt{cx-1}\,\sqrt{cx+1}-2cx\right)}{4\,(c^2x^2-1)\,c^5b\,(a+b\,\mathrm{arccosh}(cx))}$$

$$-\frac{\left(\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\sqrt{-c^2x^2+1}\,\mathrm{Ei}_1\left(2\,\mathrm{arccosh}(cx)+\frac{2a}{b}\right)\mathrm{e}^{-\frac{b\,\mathrm{arccosh}(cx)-2a}{b}}}{2c^5\,(c^2x^2-1)\,b^2}$$

$$+\frac{1}{4\,(c^2x^2-1)\,c^5b^2\,(a+b\,\mathrm{arccosh}(cx))}\left(\sqrt{-c^2x^2+1}\,\sqrt{cx-1}\,\sqrt{cx+1}\,\left(2b\sqrt{cx-1}\,\sqrt{cx+1}\,cx+2x^2bc^2+2\,\mathrm{arccosh}(cx)\,\mathrm{Ei}_1\left(-2\,\mathrm{arccosh}(cx)\right.\right.\right.$$

$$\left.\left.\left.-\frac{2a}{b}\right)\mathrm{e}^{-\frac{2a}{b}}\,b+2\,\mathrm{Ei}_1\left(-2\,\mathrm{arccosh}(cx)-\frac{2a}{b}\right)\mathrm{e}^{-\frac{2a}{b}}\,a-b\right)\right)$$

```
Problem 94: Result more than twice size of optimal antiderivative.
```

$$\int\frac{x^2}{(a+b\,\mathrm{arccosh}(cx))^2\sqrt{-c^2x^2+1}}\,dx$$

```
Optimal(type 4, 124 leaves, 7 steps):
```

$$-\frac{x^2\sqrt{cx-1}}{bc\,(a+b\,\mathrm{arccosh}(cx))\sqrt{-cx+1}}+\frac{\cosh\left(\frac{2a}{b}\right)\mathrm{Shi}\left(\frac{2\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{cx-1}}{b^2c^3\sqrt{-cx+1}}-\frac{\mathrm{Chi}\left(\frac{2\,(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sinh\left(\frac{2a}{b}\right)\sqrt{cx-1}}{b^2c^3\sqrt{-cx+1}}$$

```
Result(type 4, 376 leaves):
```

$$-\frac{\sqrt{-c^2x^2+1}\,\left(-2\sqrt{cx+1}\,\sqrt{cx-1}\,x^2c^2+2c^3x^3+\sqrt{cx-1}\,\sqrt{cx+1}-2cx\right)}{4\,(c^2x^2-1)\,c^3b\,(a+b\,\mathrm{arccosh}(cx))}$$

$$-\frac{\left(\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^2x^2-1\right)\sqrt{-c^2x^2+1}\,\mathrm{Ei}_1\left(2\,\mathrm{arccosh}(cx)+\frac{2a}{b}\right)\mathrm{e}^{-\frac{b\,\mathrm{arccosh}(cx)-2a}{b}}}{2c^3\,(c^2x^2-1)\,b^2}$$

$$+\frac{1}{4\left(c^{2}x^{2}-1\right)c^{3}b^{2}\left(a+b\operatorname{arccosh}(cx)\right)}\left(\sqrt{cx+1}\,\sqrt{cx-1}\,\sqrt{-c^{2}x^{2}+1}\left(2b\sqrt{cx-1}\,\sqrt{cx+1}\,cx+2x^{2}bc^{2}+2\operatorname{arccosh}(cx)\operatorname{Ei}_{1}\left(-2\operatorname{arccosh}(cx)-\frac{2a}{b}\right)e^{-\frac{2a}{b}}b+2\operatorname{Ei}_{1}\left(-2\operatorname{arccosh}(cx)-\frac{2a}{b}\right)e^{-\frac{2a}{b}}a-b\right)\right)+\frac{\sqrt{cx+1}\,\sqrt{cx-1}\,\sqrt{-c^{2}x^{2}+1}}{2\left(c^{2}x^{2}-1\right)c^{3}b\left(a+b\operatorname{arccosh}(cx)\right)}$$

```
Problem 95: Result more than twice size of optimal antiderivative.
```

$$\int\frac{x}{\left(a+b\operatorname{arccosh}(cx)\right)^{2}\sqrt{-c^{2}x^{2}+1}}\,dx$$

```
Optimal(type 4, 118 leaves, 5 steps):
```

$$-\frac{x\sqrt{cx-1}}{bc\left(a+b\operatorname{arccosh}(cx)\right)\sqrt{-cx+1}}+\frac{\cosh\left(\frac{a}{b}\right)\operatorname{Shi}\left(\frac{a+b\operatorname{arccosh}(cx)}{b}\right)\sqrt{cx-1}}{b^{2}c^{2}\sqrt{-cx+1}}-\frac{\operatorname{Chi}\left(\frac{a+b\operatorname{arccosh}(cx)}{b}\right)\sinh\left(\frac{a}{b}\right)\sqrt{cx-1}}{b^{2}c^{2}\sqrt{-cx+1}}$$

```
Result(type 4, 282 leaves):
```

$$-\frac{\sqrt{-c^{2}x^{2}+1}\left(-\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^{2}x^{2}-1\right)}{2\left(c^{2}x^{2}-1\right)c^{2}b\left(a+b\operatorname{arccosh}(cx)\right)}-\frac{\left(\sqrt{cx-1}\,\sqrt{cx+1}\,xc+c^{2}x^{2}-1\right)\sqrt{-c^{2}x^{2}+1}\operatorname{Ei}_{1}\left(\operatorname{arccosh}(cx)+\frac{a}{b}\right)e^{-\frac{b\operatorname{arccosh}(cx)-a}{b}}}{2c^{2}\left(c^{2}x^{2}-1\right)b^{2}}$$
$$+\frac{\sqrt{cx+1}\,\sqrt{cx-1}\,\sqrt{-c^{2}x^{2}+1}\left(e^{-\frac{a}{b}}\operatorname{Ei}_{1}\left(-\operatorname{arccosh}(cx)-\frac{a}{b}\right)\operatorname{arccosh}(cx)\,b+e^{-\frac{a}{b}}\operatorname{Ei}_{1}\left(-\operatorname{arccosh}(cx)-\frac{a}{b}\right)a+\sqrt{cx-1}\,\sqrt{cx+1}\,b+bcx\right)}{2\left(c^{2}x^{2}-1\right)c^{2}b^{2}\left(a+b\operatorname{arccosh}(cx)\right)}$$

```
Problem 103: Unable to integrate problem.
```

$$\int\sqrt{-a^{2}cx^{2}+c}\,\sqrt{\operatorname{arccosh}(ax)}\,dx$$

```
Optimal(type 4, 159 leaves, 10 steps):
```

$$-\frac{\operatorname{arccosh}(ax)^{3/2}\sqrt{-a^{2}cx^{2}+c}}{3a\sqrt{ax-1}\,\sqrt{ax+1}}+\frac{\operatorname{erf}\left(\sqrt{2}\,\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\,\sqrt{\pi}\,\sqrt{-a^{2}cx^{2}+c}}{32a\sqrt{ax-1}\,\sqrt{ax+1}}-\frac{\operatorname{erfi}\left(\sqrt{2}\,\sqrt{\operatorname{arccosh}(ax)}\right)\sqrt{2}\,\sqrt{\pi}\,\sqrt{-a^{2}cx^{2}+c}}{32a\sqrt{ax-1}\,\sqrt{ax+1}}$$
$$+\frac{x\sqrt{-a^{2}cx^{2}+c}\,\sqrt{\operatorname{arccosh}(ax)}}{2}$$

```
Result(type 8, 22 leaves):
```

$$\int\sqrt{-a^{2}cx^{2}+c}\,\sqrt{\operatorname{arccosh}(ax)}\,dx$$

```
Problem 106: Unable to integrate problem.
```

$$\int \left(-a^2 c x^2 + c\right)^{3/2} \operatorname{arccosh}(a x)^{5/2}\, dx$$

Optimal(type 4, 462 leaves, 41 steps):

$$\frac{x \left(-a^2 c x^2 + c\right)^{3/2} \operatorname{arccosh}(a x)^{5/2}}{4} + \frac{3 c x \operatorname{arccosh}(a x)^{5/2} \sqrt{-a^2 c x^2 + c}}{8} + \frac{45 c \operatorname{arccosh}(a x)^{3/2} \sqrt{-a^2 c x^2 + c}}{256 a \sqrt{a x - 1}\, \sqrt{a x + 1}} - \frac{15 a c x^2 \operatorname{arccosh}(a x)^{3/2} \sqrt{-a^2 c x^2 + c}}{32 \sqrt{a x - 1}\, \sqrt{a x + 1}}$$
$$+ \frac{5 c \left(-a^2 x^2 + 1\right)^2 \operatorname{arccosh}(a x)^{3/2} \sqrt{-a^2 c x^2 + c}}{32 a \sqrt{a x - 1}\, \sqrt{a x + 1}} - \frac{3 c \operatorname{arccosh}(a x)^{7/2} \sqrt{-a^2 c x^2 + c}}{28 a \sqrt{a x - 1}\, \sqrt{a x + 1}} + \frac{15 c \operatorname{erf}\left(\sqrt{2}\, \sqrt{\operatorname{arccosh}(a x)}\right) \sqrt{2}\, \sqrt{\pi}\, \sqrt{-a^2 c x^2 + c}}{512 a \sqrt{a x - 1}\, \sqrt{a x + 1}}$$
$$- \frac{15 c \operatorname{erfi}\left(\sqrt{2}\, \sqrt{\operatorname{arccosh}(a x)}\right) \sqrt{2}\, \sqrt{\pi}\, \sqrt{-a^2 c x^2 + c}}{512 a \sqrt{a x - 1}\, \sqrt{a x + 1}} - \frac{15 c \operatorname{erf}\left(2 \sqrt{\operatorname{arccosh}(a x)}\right) \sqrt{\pi}\, \sqrt{-a^2 c x^2 + c}}{16384 a \sqrt{a x - 1}\, \sqrt{a x + 1}}$$
$$+ \frac{15 c \operatorname{erfi}\left(2 \sqrt{\operatorname{arccosh}(a x)}\right) \sqrt{\pi}\, \sqrt{-a^2 c x^2 + c}}{16384 a \sqrt{a x - 1}\, \sqrt{a x + 1}} + \frac{225 c x \sqrt{-a^2 c x^2 + c}\, \sqrt{\operatorname{arccosh}(a x)}}{512} + \frac{15 c x (-a x + 1)(a x + 1) \sqrt{-a^2 c x^2 + c}\, \sqrt{\operatorname{arccosh}(a x)}}{256}$$

Result(type 8, 22 leaves):

$$\int \left(-a^2 c x^2 + c\right)^{3/2} \operatorname{arccosh}(a x)^{5/2}\, dx$$

Problem 108: Unable to integrate problem.

$$\int \frac{x}{\sqrt{-x^2 + 1}\, \sqrt{\operatorname{arccosh}(x)}}\, dx$$

Optimal(type 4, 45 leaves, 6 steps):

$$\frac{\operatorname{erf}\left(\sqrt{\operatorname{arccosh}(x)}\right) \sqrt{\pi}\, \sqrt{-1 + x}}{2 \sqrt{1 - x}} + \frac{\operatorname{erfi}\left(\sqrt{\operatorname{arccosh}(x)}\right) \sqrt{\pi}\, \sqrt{-1 + x}}{2 \sqrt{1 - x}}$$

Result(type 8, 17 leaves):

$$\int \frac{x}{\sqrt{-x^2 + 1}\, \sqrt{\operatorname{arccosh}(x)}}\, dx$$

Problem 111: Unable to integrate problem.

$$\int \frac{\sqrt{-a^2 c x^2 + c}}{\operatorname{arccosh}(a x)^{5/2}}\, dx$$

Optimal(type 4, 159 leaves, 7 steps):

$$\frac{2 \operatorname{erf}\left(\sqrt{2}\, \sqrt{\operatorname{arccosh}(a x)}\right) \sqrt{2}\, \sqrt{\pi}\, \sqrt{-a^2 c x^2 + c}}{3 a \sqrt{a x - 1}\, \sqrt{a x + 1}} + \frac{2 \operatorname{erfi}\left(\sqrt{2}\, \sqrt{\operatorname{arccosh}(a x)}\right) \sqrt{2}\, \sqrt{\pi}\, \sqrt{-a^2 c x^2 + c}}{3 a \sqrt{a x - 1}\, \sqrt{a x + 1}} - \frac{2 \sqrt{a x - 1}\, \sqrt{a x + 1}\, \sqrt{-a^2 c x^2 + c}}{3 a \operatorname{arccosh}(a x)^{3/2}}$$

$$-\frac{8x\sqrt{-a^2cx^2+c}}{3\sqrt{\operatorname{arccosh}(ax)}}$$

Result(type 8, 22 leaves):

$$\int \frac{\sqrt{-a^2cx^2+c}}{\operatorname{arccosh}(ax)^{5/2}}\,dx$$

Problem 112: Unable to integrate problem.

$$\int x\,(a+b\operatorname{arccosh}(cx))^n\sqrt{-c^2dx^2+d}\,dx$$

Optimal(type 4, 352 leaves, 9 steps):

$$\frac{3^{-1-n}\,(a+b\operatorname{arccosh}(cx))^n\,\Gamma\left(1+n,-\frac{3\,(a+b\operatorname{arccosh}(cx))}{b}\right)\sqrt{-c^2dx^2+d}}{8\,c^2\,e^{\frac{3a}{b}}\left(\frac{-a-b\operatorname{arccosh}(cx)}{b}\right)^n\sqrt{cx-1}\,\sqrt{cx+1}}-\frac{(a+b\operatorname{arccosh}(cx))^n\,\Gamma\left(1+n,\frac{-a-b\operatorname{arccosh}(cx)}{b}\right)\sqrt{-c^2dx^2+d}}{8\,c^2\,e^{\frac{a}{b}}\left(\frac{-a-b\operatorname{arccosh}(cx)}{b}\right)^n\sqrt{cx-1}\,\sqrt{cx+1}}$$

$$+\frac{e^{\frac{a}{b}}\,(a+b\operatorname{arccosh}(cx))^n\,\Gamma\left(1+n,\frac{a+b\operatorname{arccosh}(cx)}{b}\right)\sqrt{-c^2dx^2+d}}{8\,c^2\left(\frac{a+b\operatorname{arccosh}(cx)}{b}\right)^n\sqrt{cx-1}\,\sqrt{cx+1}}$$

$$-\frac{3^{-1-n}\,e^{\frac{3a}{b}}\,(a+b\operatorname{arccosh}(cx))^n\,\Gamma\left(1+n,\frac{3\,(a+b\operatorname{arccosh}(cx))}{b}\right)\sqrt{-c^2dx^2+d}}{8\,c^2\left(\frac{a+b\operatorname{arccosh}(cx)}{b}\right)^n\sqrt{cx-1}\,\sqrt{cx+1}}$$

Result(type 8, 27 leaves):

$$\int x\,(a+b\operatorname{arccosh}(cx))^n\sqrt{-c^2dx^2+d}\,dx$$

Problem 115: Unable to integrate problem.

$$\int x\,(-c^2dx^2+d)^{5/2}\,(a+b\operatorname{arccosh}(cx))^n\,dx$$

Optimal(type 4, 738 leaves, 15 steps):

$$\frac{7^{-1-n}\,d^2\,(a+b\operatorname{arccosh}(cx))^n\,\Gamma\left(1+n,-\frac{7\,(a+b\operatorname{arccosh}(cx))}{b}\right)\sqrt{-c^2dx^2+d}}{128\,c^2\,e^{\frac{7a}{b}}\left(\frac{-a-b\operatorname{arccosh}(cx)}{b}\right)^n\sqrt{cx-1}\,\sqrt{cx+1}}$$

$$-\frac{d^2 (a+b\,\mathrm{arccosh}(cx))^n \Gamma\left(1+n, -\frac{5(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-c^2 d x^2+d}}{128\, 5^n c^2 \mathrm{e}^{\frac{5a}{b}} \left(\frac{-a-b\,\mathrm{arccosh}(cx)}{b}\right)^n \sqrt{cx-1}\sqrt{cx+1}}$$

$$+\frac{3^{1-n} d^2 (a+b\,\mathrm{arccosh}(cx))^n \Gamma\left(1+n, -\frac{3(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-c^2 d x^2+d}}{128\, c^2 \mathrm{e}^{\frac{3a}{b}} \left(\frac{-a-b\,\mathrm{arccosh}(cx)}{b}\right)^n \sqrt{cx-1}\sqrt{cx+1}}$$

$$-\frac{5 d^2 (a+b\,\mathrm{arccosh}(cx))^n \Gamma\left(1+n, \frac{-a-b\,\mathrm{arccosh}(cx)}{b}\right)\sqrt{-c^2 d x^2+d}}{128\, c^2 \mathrm{e}^{\frac{a}{b}} \left(\frac{-a-b\,\mathrm{arccosh}(cx)}{b}\right)^n \sqrt{cx-1}\sqrt{cx+1}}$$

$$+\frac{5 d^2 \mathrm{e}^{\frac{a}{b}} (a+b\,\mathrm{arccosh}(cx))^n \Gamma\left(1+n, \frac{a+b\,\mathrm{arccosh}(cx)}{b}\right)\sqrt{-c^2 d x^2+d}}{128\, c^2 \left(\frac{a+b\,\mathrm{arccosh}(cx)}{b}\right)^n \sqrt{cx-1}\sqrt{cx+1}}$$

$$-\frac{3^{1-n} d^2 \mathrm{e}^{\frac{3a}{b}} (a+b\,\mathrm{arccosh}(cx))^n \Gamma\left(1+n, \frac{3(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-c^2 d x^2+d}}{128\, c^2 \left(\frac{a+b\,\mathrm{arccosh}(cx)}{b}\right)^n \sqrt{cx-1}\sqrt{cx+1}}$$

$$+\frac{d^2 \mathrm{e}^{\frac{5a}{b}} (a+b\,\mathrm{arccosh}(cx))^n \Gamma\left(1+n, \frac{5(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-c^2 d x^2+d}}{128\, 5^n c^2 \left(\frac{a+b\,\mathrm{arccosh}(cx)}{b}\right)^n \sqrt{cx-1}\sqrt{cx+1}}$$

$$-\frac{7^{-1-n} d^2 \mathrm{e}^{\frac{7a}{b}} (a+b\,\mathrm{arccosh}(cx))^n \Gamma\left(1+n, \frac{7(a+b\,\mathrm{arccosh}(cx))}{b}\right)\sqrt{-c^2 d x^2+d}}{128\, c^2 \left(\frac{a+b\,\mathrm{arccosh}(cx)}{b}\right)^n \sqrt{cx-1}\sqrt{cx+1}}$$

Result(type 8, 27 leaves):

$$\int x\left(-c^2 d x^2+d\right)^{5/2} (a+b\,\mathrm{arccosh}(cx))^n \,\mathrm{d}x$$

Problem 117: Unable to integrate problem.

$$\int \frac{x^3 (a+b\,\mathrm{arccosh}(cx))^n}{\sqrt{-c^2 x^2+1}} \,\mathrm{d}x$$

Optimal(type 4, 304 leaves, 9 steps):

$$\frac{3^{-1-n}\,(a+b\,\mathrm{arccosh}(c\,x))^n\,\Gamma\!\left(1+n,-\frac{3\,(a+b\,\mathrm{arccosh}(c\,x))}{b}\right)\sqrt{c\,x-1}}{8\,c^4\,\mathrm{e}^{\frac{3\,a}{b}}\left(\frac{-a-b\,\mathrm{arccosh}(c\,x)}{b}\right)^n\sqrt{-c\,x+1}}+\frac{3\,(a+b\,\mathrm{arccosh}(c\,x))^n\,\Gamma\!\left(1+n,\frac{-a-b\,\mathrm{arccosh}(c\,x)}{b}\right)\sqrt{c\,x-1}}{8\,c^4\,\mathrm{e}^{\frac{a}{b}}\left(\frac{-a-b\,\mathrm{arccosh}(c\,x)}{b}\right)^n\sqrt{-c\,x+1}}$$

$$-\frac{3\,\mathrm{e}^{\frac{a}{b}}\,(a+b\,\mathrm{arccosh}(c\,x))^n\,\Gamma\!\left(1+n,\frac{a+b\,\mathrm{arccosh}(c\,x)}{b}\right)\sqrt{c\,x-1}}{8\,c^4\left(\frac{a+b\,\mathrm{arccosh}(c\,x)}{b}\right)^n\sqrt{-c\,x+1}}$$

$$-\frac{3^{-1-n}\,\mathrm{e}^{\frac{3\,a}{b}}\,(a+b\,\mathrm{arccosh}(c\,x))^n\,\Gamma\!\left(1+n,\frac{3\,(a+b\,\mathrm{arccosh}(c\,x))}{b}\right)\sqrt{c\,x-1}}{8\,c^4\left(\frac{a+b\,\mathrm{arccosh}(c\,x)}{b}\right)^n\sqrt{-c\,x+1}}$$

Result(type 8, 28 leaves):

$$\int\frac{x^3\,(a+b\,\mathrm{arccosh}(c\,x))^n}{\sqrt{-c^2\,x^2+1}}\,\mathrm{d}x$$

Problem 118: Unable to integrate problem.

$$\int\frac{x^2\,(a+b\,\mathrm{arccosh}(c\,x))^n}{\sqrt{-c^2\,x^2+1}}\,\mathrm{d}x$$

Optimal(type 4, 199 leaves, 6 steps):

$$\frac{(a+b\,\mathrm{arccosh}(c\,x))^{1+n}\sqrt{c\,x-1}}{2\,b\,c^3\,(1+n)\sqrt{-c\,x+1}}+\frac{2^{-3-n}\,(a+b\,\mathrm{arccosh}(c\,x))^n\,\Gamma\!\left(1+n,-\frac{2\,(a+b\,\mathrm{arccosh}(c\,x))}{b}\right)\sqrt{c\,x-1}}{c^3\,\mathrm{e}^{\frac{2\,a}{b}}\left(\frac{-a-b\,\mathrm{arccosh}(c\,x)}{b}\right)^n\sqrt{-c\,x+1}}$$

$$-\frac{2^{-3-n}\,\mathrm{e}^{\frac{2\,a}{b}}\,(a+b\,\mathrm{arccosh}(c\,x))^n\,\Gamma\!\left(1+n,\frac{2\,(a+b\,\mathrm{arccosh}(c\,x))}{b}\right)\sqrt{c\,x-1}}{c^3\left(\frac{a+b\,\mathrm{arccosh}(c\,x)}{b}\right)^n\sqrt{-c\,x+1}}$$

Result(type 8, 28 leaves):

$$\int\frac{x^2\,(a+b\,\mathrm{arccosh}(c\,x))^n}{\sqrt{-c^2\,x^2+1}}\,\mathrm{d}x$$

Problem 120: Unable to integrate problem.

$$\int \frac{x\,(a+b\,\mathrm{arccosh}(c\,x))^n}{\sqrt{-c^2\,d\,x^2+d}}\,dx$$

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

$$\frac{(a+b\,\mathrm{arccosh}(c\,x))^n\,\Gamma\left(1+n,\frac{-a-b\,\mathrm{arccosh}(c\,x)}{b}\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{2\,c^2\,\mathrm{e}^{\frac{a}{b}}\left(\frac{-a-b\,\mathrm{arccosh}(c\,x)}{b}\right)^n\sqrt{-c^2\,d\,x^2+d}}-\frac{\mathrm{e}^{\frac{a}{b}}\,(a+b\,\mathrm{arccosh}(c\,x))^n\,\Gamma\left(1+n,\frac{a+b\,\mathrm{arccosh}(c\,x)}{b}\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{2\,c^2\left(\frac{a+b\,\mathrm{arccosh}(c\,x)}{b}\right)^n\sqrt{-c^2\,d\,x^2+d}}$$

Result(type 8, 27 leaves):

$$\int \frac{x\,(a+b\,\mathrm{arccosh}(c\,x))^n}{\sqrt{-c^2\,d\,x^2+d}}\,dx$$

Problem 134: Result is not expressed in closed-form.

$$\int \frac{x^4\,(a+b\,\mathrm{arccosh}(c\,x))}{e\,x^2+d}\,dx$$

Optimal(type 4, 617 leaves, 27 steps):

$$-\frac{a\,d\,x}{e^2}-\frac{b\,d\,x\,\mathrm{arccosh}(c\,x)}{e^2}+\frac{x^3\,(a+b\,\mathrm{arccosh}(c\,x))}{3\,e}+\frac{(-d)^{3/2}\,(a+b\,\mathrm{arccosh}(c\,x))\ln\left(1-\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{e}}{c\sqrt{-d}-\sqrt{-c^2\,d-e}}\right)}{2\,e^{5/2}}$$
$$-\frac{(-d)^{3/2}\,(a+b\,\mathrm{arccosh}(c\,x))\ln\left(1+\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{e}}{c\sqrt{-d}-\sqrt{-c^2\,d-e}}\right)}{2\,e^{5/2}}+\frac{(-d)^{3/2}\,(a+b\,\mathrm{arccosh}(c\,x))\ln\left(1-\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{e}}{c\sqrt{-d}+\sqrt{-c^2\,d-e}}\right)}{2\,e^{5/2}}$$
$$-\frac{(-d)^{3/2}\,(a+b\,\mathrm{arccosh}(c\,x))\ln\left(1+\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{e}}{c\sqrt{-d}+\sqrt{-c^2\,d-e}}\right)}{2\,e^{5/2}}-\frac{b\,(-d)^{3/2}\,\mathrm{polylog}\left(2,-\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{e}}{c\sqrt{-d}-\sqrt{-c^2\,d-e}}\right)}{2\,e^{5/2}}$$
$$+\frac{b\,(-d)^{3/2}\,\mathrm{polylog}\left(2,\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{e}}{c\sqrt{-d}-\sqrt{-c^2\,d-e}}\right)}{2\,e^{5/2}}-\frac{b\,(-d)^{3/2}\,\mathrm{polylog}\left(2,-\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{e}}{c\sqrt{-d}+\sqrt{-c^2\,d-e}}\right)}{2\,e^{5/2}}$$
$$+\frac{b\,(-d)^{3/2}\,\mathrm{polylog}\left(2,\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)\sqrt{e}}{c\sqrt{-d}+\sqrt{-c^2\,d-e}}\right)}{2\,e^{5/2}}+\frac{b\,d\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{c\,e^2}-\frac{2\,b\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{9\,c^3\,e}-\frac{b\,x^2\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{9\,c\,e}$$

Result(type 7, 363 leaves):

$$\frac{a x^3}{3 e} - \frac{a d x}{e^2} + \frac{a d^2 \arctan\left(\frac{x e}{\sqrt{d e}}\right)}{e^2 \sqrt{d e}} - \frac{b d x \operatorname{arccosh}(c x)}{e^2} + \frac{b \operatorname{arccosh}(c x) x^3}{3 e}$$

$$+ \frac{c b d^2 \left(\sum_{\_R1 = RootOf(e \_Z^4 + (4 c^2 d + 2 e) \_Z^2 + e)} \frac{\_R1 \left(\operatorname{arccosh}(c x) \ln\left(\frac{\_R1 - c x - \sqrt{c x - 1}\, \sqrt{c x + 1}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - c x - \sqrt{c x - 1}\, \sqrt{c x + 1}}{\_R1}\right)\right)}{\_R1^2 e + 2 c^2 d + e}\right)}{2 e^2}$$

$$- \frac{c b d^2 \left(\sum_{\_R1 = RootOf(e \_Z^4 + (4 c^2 d + 2 e) \_Z^2 + e)} \frac{\operatorname{arccosh}(c x) \ln\left(\frac{\_R1 - c x - \sqrt{c x - 1}\, \sqrt{c x + 1}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - c x - \sqrt{c x - 1}\, \sqrt{c x + 1}}{\_R1}\right)}{\_R1 \left(\_R1^2 e + 2 c^2 d + e\right)}\right)}{2 e^2}$$

$$- \frac{b x^2 \sqrt{c x - 1}\, \sqrt{c x + 1}}{9 c e} + \frac{b d \sqrt{c x - 1}\, \sqrt{c x + 1}}{c e^2} - \frac{2 b \sqrt{c x - 1}\, \sqrt{c x + 1}}{9 c^3 e}$$

Problem 135: Result is not expressed in closed-form.

$$\int \frac{x^2 (a + b \operatorname{arccosh}(c x))}{e x^2 + d}\, dx$$

Optimal(type 4, 548 leaves, 23 steps):

$$\frac{a x}{e} + \frac{b x \operatorname{arccosh}(c x)}{e} + \frac{(a + b \operatorname{arccosh}(c x)) \ln\left(1 - \frac{\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right) \sqrt{e}}{c \sqrt{-d} - \sqrt{-c^2 d - e}}\right) \sqrt{-d}}{2 e^{3/2}}$$

$$- \frac{(a + b \operatorname{arccosh}(c x)) \ln\left(1 + \frac{\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right) \sqrt{e}}{c \sqrt{-d} - \sqrt{-c^2 d - e}}\right) \sqrt{-d}}{2 e^{3/2}} + \frac{(a + b \operatorname{arccosh}(c x)) \ln\left(1 - \frac{\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right) \sqrt{e}}{c \sqrt{-d} + \sqrt{-c^2 d - e}}\right) \sqrt{-d}}{2 e^{3/2}}$$

$$- \frac{(a + b \operatorname{arccosh}(c x)) \ln\left(1 + \frac{\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right) \sqrt{e}}{c \sqrt{-d} + \sqrt{-c^2 d - e}}\right) \sqrt{-d}}{2 e^{3/2}} - \frac{b \operatorname{polylog}\left(2, -\frac{\left(c x + \sqrt{c x - 1}\, \sqrt{c x + 1}\right) \sqrt{e}}{c \sqrt{-d} - \sqrt{-c^2 d - e}}\right) \sqrt{-d}}{2 e^{3/2}}$$

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

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

Result(type 7, 283 leaves):

$$\frac{a x}{e}-\frac{a d \arctan\left(\frac{x e}{\sqrt{d e}}\right)}{e \sqrt{d e}}-\frac{b \sqrt{c x-1}\, \sqrt{c x+1}}{c e}+\frac{b x \operatorname{arccosh}(c x)}{e}
-\frac{c b d\left(\sum_{_R1=RootOf\left(e _Z^4+\left(4 c^2 d+2 e\right) _Z^2+e\right)} \frac{_R1\left(\operatorname{arccosh}(c x) \ln\left(\frac{_R1-c x-\sqrt{c x-1}\, \sqrt{c x+1}}{_R1}\right)+\operatorname{dilog}\left(\frac{_R1-c x-\sqrt{c x-1}\, \sqrt{c x+1}}{_R1}\right)\right)}{_R1^2 e+2 c^2 d+e}\right)}{2 e}
+\frac{c b d\left(\sum_{_R1=RootOf\left(e _Z^4+\left(4 c^2 d+2 e\right) _Z^2+e\right)} \frac{\operatorname{arccosh}(c x) \ln\left(\frac{_R1-c x-\sqrt{c x-1}\, \sqrt{c x+1}}{_R1}\right)+\operatorname{dilog}\left(\frac{_R1-c x-\sqrt{c x-1}\, \sqrt{c x+1}}{_R1}\right)}{_R1\left(_R1^2 e+2 c^2 d+e\right)}\right)}{2 e}$$

Problem 136: Result is not expressed in closed-form.

$$\int \frac{x\left(a+b \operatorname{arccosh}(c x)\right)}{e x^2+d}\, dx$$

Optimal(type 4, 487 leaves, 18 steps):

$$-\frac{\left(a+b \operatorname{arccosh}(c x)\right)^2}{2 b e}+\frac{\left(a+b \operatorname{arccosh}(c x)\right) \ln\left(1-\frac{\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right) \sqrt{e}}{c \sqrt{-d}-\sqrt{-c^2 d-e}}\right)}{2 e}
+\frac{\left(a+b \operatorname{arccosh}(c x)\right) \ln\left(1+\frac{\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right) \sqrt{e}}{c \sqrt{-d}-\sqrt{-c^2 d-e}}\right)}{2 e}+\frac{\left(a+b \operatorname{arccosh}(c x)\right) \ln\left(1-\frac{\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right) \sqrt{e}}{c \sqrt{-d}+\sqrt{-c^2 d-e}}\right)}{2 e}
+\frac{\left(a+b \operatorname{arccosh}(c x)\right) \ln\left(1+\frac{\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right) \sqrt{e}}{c \sqrt{-d}+\sqrt{-c^2 d-e}}\right)}{2 e}+\frac{b \operatorname{polylog}\left(2,-\frac{\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right) \sqrt{e}}{c \sqrt{-d}-\sqrt{-c^2 d-e}}\right)}{2 e}
+\frac{b \operatorname{polylog}\left(2,\frac{\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right) \sqrt{e}}{c \sqrt{-d}-\sqrt{-c^2 d-e}}\right)}{2 e}+\frac{b \operatorname{polylog}\left(2,-\frac{\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right) \sqrt{e}}{c \sqrt{-d}+\sqrt{-c^2 d-e}}\right)}{2 e}
+\frac{b \operatorname{polylog}\left(2,\frac{\left(c x+\sqrt{c x-1}\, \sqrt{c x+1}\right) \sqrt{e}}{c \sqrt{-d}+\sqrt{-c^2 d-e}}\right)}{2 e}$$

Result(type 7, 371 leaves):

$$\frac{a \ln\left(c^2 e x^2 + c^2 d\right)}{2 e} - \frac{b \operatorname{arccosh}(c x)^2}{2 e} + \frac{1}{2 e}\left(b\left(\sum_{\_R1 = RootOf(e \_Z^4 + (4 c^2 d + 2 e) \_Z^2 + e)} \frac{(\_R1^2 e + 4 c^2 d + 2 e)\left(\operatorname{arccosh}(c x) \ln\left(\frac{\_R1 - c x - \sqrt{c x - 1}\sqrt{c x + 1}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - c x - \sqrt{c x - 1}\sqrt{c x + 1}}{\_R1}\right)\right)}{\_R1^2 e + 2 c^2 d + e}\right)\right)$$

$$- \frac{b\left(\sum_{\_R1 = RootOf(e \_Z^4 + (4 c^2 d + 2 e) \_Z^2 + e)} \frac{\operatorname{arccosh}(c x) \ln\left(\frac{\_R1 - c x - \sqrt{c x - 1}\sqrt{c x + 1}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - c x - \sqrt{c x - 1}\sqrt{c x + 1}}{\_R1}\right)}{\_R1^2 e + 2 c^2 d + e}\right)}{2}$$

$$- \frac{c^2 b d\left(\sum_{\_R1 = RootOf(e \_Z^4 + (4 c^2 d + 2 e) \_Z^2 + e)} \frac{\operatorname{arccosh}(c x) \ln\left(\frac{\_R1 - c x - \sqrt{c x - 1}\sqrt{c x + 1}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - c x - \sqrt{c x - 1}\sqrt{c x + 1}}{\_R1}\right)}{\_R1^2 e + 2 c^2 d + e}\right)}{e}$$

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Problem 137: Result is not expressed in closed-form.
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$$\int \frac{x^2 (a + b \operatorname{arccosh}(c x))}{(e x^2 + d)^2}\, dx$$

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Optimal(type 4, 723 leaves, 46 steps):
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$$\frac{(a + b \operatorname{arccosh}(c x)) \ln\left(1 - \frac{\left(c x + \sqrt{c x - 1}\sqrt{c x + 1}\right)\sqrt{e}}{c\sqrt{-d} - \sqrt{-c^2 d - e}}\right)}{4 e^{3/2}\sqrt{-d}} - \frac{(a + b \operatorname{arccosh}(c x)) \ln\left(1 + \frac{\left(c x + \sqrt{c x - 1}\sqrt{c x + 1}\right)\sqrt{e}}{c\sqrt{-d} - \sqrt{-c^2 d - e}}\right)}{4 e^{3/2}\sqrt{-d}}$$

$$+ \frac{(a + b \operatorname{arccosh}(c x)) \ln\left(1 - \frac{\left(c x + \sqrt{c x - 1}\sqrt{c x + 1}\right)\sqrt{e}}{c\sqrt{-d} + \sqrt{-c^2 d - e}}\right)}{4 e^{3/2}\sqrt{-d}} - \frac{(a + b \operatorname{arccosh}(c x)) \ln\left(1 + \frac{\left(c x + \sqrt{c x - 1}\sqrt{c x + 1}\right)\sqrt{e}}{c\sqrt{-d} + \sqrt{-c^2 d - e}}\right)}{4 e^{3/2}\sqrt{-d}}$$

$$- \frac{b \operatorname{polylog}\left(2, -\frac{\left(c x + \sqrt{c x - 1}\sqrt{c x + 1}\right)\sqrt{e}}{c\sqrt{-d} - \sqrt{-c^2 d - e}}\right)}{4 e^{3/2}\sqrt{-d}} + \frac{b \operatorname{polylog}\left(2, \frac{\left(c x + \sqrt{c x - 1}\sqrt{c x + 1}\right)\sqrt{e}}{c\sqrt{-d} - \sqrt{-c^2 d - e}}\right)}{4 e^{3/2}\sqrt{-d}}$$

$$-\frac{b\,\mathrm{polylog}\left(2, -\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)\sqrt{e}}{c\sqrt{-d}+\sqrt{-c^2 d-e}}\right)}{4 e^{3/2}\sqrt{-d}}+\frac{b\,\mathrm{polylog}\left(2, \frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)\sqrt{e}}{c\sqrt{-d}+\sqrt{-c^2 d-e}}\right)}{4 e^{3/2}\sqrt{-d}}+\frac{a+b\,\mathrm{arccosh}(cx)}{4 e^{3/2}\left(\sqrt{-d}-x\sqrt{e}\right)}$$

$$+\frac{-a-b\,\mathrm{arccosh}(cx)}{4 e^{3/2}\left(\sqrt{-d}+x\sqrt{e}\right)}-\frac{b\,c\,\mathrm{arctanh}\left(\frac{\sqrt{cx+1}\,\sqrt{c\sqrt{-d}-\sqrt{e}}}{\sqrt{cx-1}\,\sqrt{c\sqrt{-d}+\sqrt{e}}}\right)}{2 e^{3/2}\sqrt{c\sqrt{-d}-\sqrt{e}}\,\sqrt{c\sqrt{-d}+\sqrt{e}}}+\frac{b\,c\,\mathrm{arctanh}\left(\frac{\sqrt{cx+1}\,\sqrt{c\sqrt{-d}+\sqrt{e}}}{\sqrt{cx-1}\,\sqrt{c\sqrt{-d}-\sqrt{e}}}\right)}{2 e^{3/2}\sqrt{c\sqrt{-d}-\sqrt{e}}\,\sqrt{c\sqrt{-d}+\sqrt{e}}}$$

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Result(type 7, 1688 leaves):
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$$-\frac{c^2 a x}{2 e\left(c^2 e x^2+c^2 d\right)}+\frac{a\arctan\left(\frac{x e}{\sqrt{d e}}\right)}{2 e\sqrt{d e}}-\frac{c^2 b\,\mathrm{arccosh}(cx)\,x}{2 e\left(c^2 e x^2+c^2 d\right)}$$

$$-\frac{c^5 b\sqrt{-\left(2c^2 d-2\sqrt{c^2 d\left(c^2 d+e\right)}+e\right)e}\;\mathrm{arctanh}\left(\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)e}{\sqrt{\left(-2c^2 d+2\sqrt{c^2 d\left(c^2 d+e\right)}-e\right)e}}\right)d^2}{e^4\left(c^2 d+e\right)}$$

$$-\frac{c^3 b\sqrt{-\left(2c^2 d-2\sqrt{c^2 d\left(c^2 d+e\right)}+e\right)e}\;\mathrm{arctanh}\left(\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)e}{\sqrt{\left(-2c^2 d+2\sqrt{c^2 d\left(c^2 d+e\right)}-e\right)e}}\right)\sqrt{c^2 d\left(c^2 d+e\right)}\,d}{e^4\left(c^2 d+e\right)}$$

$$-\frac{c^3 b\sqrt{-\left(2c^2 d-2\sqrt{c^2 d\left(c^2 d+e\right)}+e\right)e}\;\mathrm{arctanh}\left(\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)e}{\sqrt{\left(-2c^2 d+2\sqrt{c^2 d\left(c^2 d+e\right)}-e\right)e}}\right)d}{e^3\left(c^2 d+e\right)}$$

$$-\frac{c\,b\sqrt{-\left(2c^2 d-2\sqrt{c^2 d\left(c^2 d+e\right)}+e\right)e}\;\mathrm{arctanh}\left(\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)e}{\sqrt{\left(-2c^2 d+2\sqrt{c^2 d\left(c^2 d+e\right)}-e\right)e}}\right)\sqrt{c^2 d\left(c^2 d+e\right)}}{2 e^3\left(c^2 d+e\right)}$$

$$+\frac{c^3 b\sqrt{-\left(2c^2 d-2\sqrt{c^2 d\left(c^2 d+e\right)}+e\right)e}\;\mathrm{arctanh}\left(\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)e}{\sqrt{\left(-2c^2 d+2\sqrt{c^2 d\left(c^2 d+e\right)}-e\right)e}}\right)d}{e^4}$$

$$+\frac{c\,b\sqrt{-\left(2c^2 d-2\sqrt{c^2 d\left(c^2 d+e\right)}+e\right)e}\;\mathrm{arctanh}\left(\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)e}{\sqrt{\left(-2c^2 d+2\sqrt{c^2 d\left(c^2 d+e\right)}-e\right)e}}\right)\sqrt{c^2 d\left(c^2 d+e\right)}}{e^4}$$

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

$$-\frac{c^{5}\,b\,\sqrt{\left(2\,c^{2}\,d+2\,\sqrt{c^{2}\,d\,(c^{2}\,d+e)}+e\right)e}\;\arctan\left(\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)e}{\sqrt{\left(2\,c^{2}\,d+2\,\sqrt{c^{2}\,d\,(c^{2}\,d+e)}+e\right)e}}\right)d^{2}}{e^{4}\,(c^{2}\,d+e)}$$

$$+\frac{c^{3}\,b\,\sqrt{\left(2\,c^{2}\,d+2\,\sqrt{c^{2}\,d\,(c^{2}\,d+e)}+e\right)e}\;\arctan\left(\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)e}{\sqrt{\left(2\,c^{2}\,d+2\,\sqrt{c^{2}\,d\,(c^{2}\,d+e)}+e\right)e}}\right)\sqrt{c^{2}\,d\,(c^{2}\,d+e)}\,d}{e^{4}\,(c^{2}\,d+e)}$$

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

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

$$+\frac{c^{3}\,b\,\sqrt{\left(2\,c^{2}\,d+2\,\sqrt{c^{2}\,d\,(c^{2}\,d+e)}+e\right)e}\;\arctan\left(\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)e}{\sqrt{\left(2\,c^{2}\,d+2\,\sqrt{c^{2}\,d\,(c^{2}\,d+e)}+e\right)e}}\right)d}{e^{4}}$$

$$-\frac{c\,b\,\sqrt{\left(2\,c^{2}\,d+2\,\sqrt{c^{2}\,d\,(c^{2}\,d+e)}+e\right)e}\;\arctan\left(\frac{\left(c\,x+\sqrt{c\,x-1}\,\sqrt{c\,x+1}\right)e}{\sqrt{\left(2\,c^{2}\,d+2\,\sqrt{c^{2}\,d\,(c^{2}\,d+e)}+e\right)e}}\right)\sqrt{c^{2}\,d\,(c^{2}\,d+e)}}{e^{4}}$$

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

$$+\frac{c\,b\left(\sum_{\_R1=\mathrm{RootOf}\left(e\,\_Z^{4}+(4\,c^{2}\,d+2\,e)\,\_Z^{2}+e\right)}\frac{\_R1\left(\operatorname{arccosh}(c\,x)\,\ln\left(\frac{\_R1-c\,x-\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{\_R1}\right)+\operatorname{dilog}\left(\frac{\_R1-c\,x-\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{\_R1}\right)\right)}{\_R1^{2}\,e+2\,c^{2}\,d+e}\right)}{4\,e}$$

$$-\frac{c\,b\left(\sum_{\_R1=RootOf\left(e\,\_Z^4+\left(4\,c^2\,d+2\,e\right)\,\_Z^2+e\right)}\frac{\operatorname{arccosh}(c\,x)\,\ln\left(\frac{\_R1-c\,x-\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{\_R1}\right)+\operatorname{dilog}\left(\frac{\_R1-c\,x-\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{\_R1}\right)}{\_R1\,\left(\_R1^2\,e+2\,c^2\,d+e\right)}\right)}{4\,e}$$

Problem 138: Result more than twice size of optimal antiderivative.

$$\int\frac{x^3\,\left(a+b\operatorname{arccosh}(c\,x)\right)}{\left(e\,x^2+d\right)^3}\,dx$$

Optimal(type 3, 197 leaves, 9 steps):

$$\frac{x^4\,\left(a+b\operatorname{arccosh}(c\,x)\right)}{4\,d\,\left(e\,x^2+d\right)^2}-\frac{b\,c\,x\,\left(-c^2\,x^2+1\right)}{8\,e\,\left(c^2\,d+e\right)\,\left(e\,x^2+d\right)\sqrt{c\,x-1}\,\sqrt{c\,x+1}}-\frac{b\arcsin(c\,x)\,\sqrt{-c^2\,x^2+1}}{4\,d\,e^2\sqrt{c\,x-1}\,\sqrt{c\,x+1}}$$
$$+\frac{b\,c\,\left(2\,c^2\,d+3\,e\right)\arctan\left(\frac{x\sqrt{c^2\,d+e}}{\sqrt{d}\,\sqrt{-c^2\,x^2+1}}\right)\sqrt{-c^2\,x^2+1}}{8\,e^2\,\left(c^2\,d+e\right)^{3/2}\sqrt{d}\,\sqrt{c\,x-1}\,\sqrt{c\,x+1}}$$

Result(type ?, 2498 leaves): Display of huge result suppressed!

Problem 140: Unable to integrate problem.

$$\int(f\,x)^m\left(e\,x^2+d\right)\,\left(a+b\operatorname{arccosh}(c\,x)\right)\,dx$$

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

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

Result(type 8, 23 leaves):

$$\int(f\,x)^m\left(e\,x^2+d\right)\,\left(a+b\operatorname{arccosh}(c\,x)\right)\,dx$$

Problem 148: Unable to integrate problem.

$$\int\sqrt{a+b\operatorname{arccosh}(c\,x)}\,dx$$

Optimal(type 4, 79 leaves, 7 steps):

$$-\frac{e^{\frac{a}{b}}\operatorname{erf}\left(\frac{\sqrt{a+b\,\mathrm{arccosh}(c x)}}{\sqrt{b}}\right)\sqrt{b}\,\sqrt{\pi}}{4 c}-\frac{\operatorname{erfi}\left(\frac{\sqrt{a+b\,\mathrm{arccosh}(c x)}}{\sqrt{b}}\right)\sqrt{b}\,\sqrt{\pi}}{4 c\,e^{\frac{a}{b}}}+x\sqrt{a+b\,\mathrm{arccosh}(c x)}$$

Result(type 8, 12 leaves):

$$\int\sqrt{a+b\,\mathrm{arccosh}(c x)}\,\mathrm{d}x$$

Problem 151: Unable to integrate problem.

$$\int(a+b\,\mathrm{arccosh}(c x))^{3/2}\,\mathrm{d}x$$

Optimal(type 4, 109 leaves, 8 steps):

$$x(a+b\,\mathrm{arccosh}(c x))^{3/2}-\frac{3 b^{3/2} e^{\frac{a}{b}}\operatorname{erf}\left(\frac{\sqrt{a+b\,\mathrm{arccosh}(c x)}}{\sqrt{b}}\right)\sqrt{\pi}}{8 c}+\frac{3 b^{3/2}\operatorname{erfi}\left(\frac{\sqrt{a+b\,\mathrm{arccosh}(c x)}}{\sqrt{b}}\right)\sqrt{\pi}}{8 c\,e^{\frac{a}{b}}}$$
$$-\frac{3 b\sqrt{c x-1}\,\sqrt{c x+1}\,\sqrt{a+b\,\mathrm{arccosh}(c x)}}{2 c}$$

Result(type 8, 12 leaves):

$$\int(a+b\,\mathrm{arccosh}(c x))^{3/2}\,\mathrm{d}x$$

Test results for the 79 problems in "7.2.5 Inverse hyperbolic cosine functions.txt"

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

$$\int(e x+d)^3\,\mathrm{arccosh}(c x)\,\mathrm{d}x$$

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

$$-\frac{\left(8 d^4 c^4+24 c^2 d^2 e^2+3 e^4\right)\mathrm{arccosh}(c x)}{32 c^4 e}+\frac{(e x+d)^4\,\mathrm{arccosh}(c x)}{4 e}-\frac{7 d (e x+d)^2\sqrt{c x-1}\,\sqrt{c x+1}}{48 c}-\frac{(e x+d)^3\sqrt{c x-1}\,\sqrt{c x+1}}{16 c}$$
$$-\frac{\left(4 d\left(19 c^2 d^2+16 e^2\right)+e\left(26 c^2 d^2+9 e^2\right)x\right)\sqrt{c x-1}\,\sqrt{c x+1}}{96 c^3}$$

Result(type 3, 350 leaves):

$$\frac{e^3\,\mathrm{arccosh}(c x)\,x^4}{4}+e^2\,\mathrm{arccosh}(c x)\,x^3 d+\frac{3 e\,\mathrm{arccosh}(c x)\,x^2 d^2}{2}+\mathrm{arccosh}(c x)\,x d^3+\frac{\mathrm{arccosh}(c x)\,d^4}{4 e}-\frac{e^3\sqrt{c x-1}\,\sqrt{c x+1}\,x^3}{16 c}$$

$$-\frac{e^2\sqrt{cx-1}\,\sqrt{cx+1}\,x^2 d}{3c}-\frac{3e\sqrt{cx-1}\,\sqrt{cx+1}\,d^2 x}{4c}-\frac{\sqrt{cx-1}\,\sqrt{cx+1}\,d^4\ln\left(cx+\sqrt{c^2x^2-1}\right)}{4e\sqrt{c^2x^2-1}}-\frac{\sqrt{cx-1}\,\sqrt{cx+1}\,d^3}{c}$$

$$-\frac{3e^3\sqrt{cx-1}\,\sqrt{cx+1}\,x}{32c^3}-\frac{3e\sqrt{cx-1}\,\sqrt{cx+1}\,d^2\ln\left(cx+\sqrt{c^2x^2-1}\right)}{4c^2\sqrt{c^2x^2-1}}-\frac{2e^2\sqrt{cx-1}\,\sqrt{cx+1}\,d}{3c^3}$$

$$-\frac{3e^3\sqrt{cx-1}\,\sqrt{cx+1}\,\ln\left(cx+\sqrt{c^2x^2-1}\right)}{32c^4\sqrt{c^2x^2-1}}$$

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

$$\int\frac{\operatorname{arccosh}(cx)}{(ex+d)^4}\,\mathrm{d}x$$

Optimal(type 3, 167 leaves, 6 steps):

$$-\frac{\operatorname{arccosh}(cx)}{3e(ex+d)^3}+\frac{c^3\left(2c^2d^2+e^2\right)\operatorname{arctanh}\left(\frac{\sqrt{dc+e}\,\sqrt{cx+1}}{\sqrt{dc-e}\,\sqrt{cx-1}}\right)}{3(dc-e)^{5/2}e(dc+e)^{5/2}}-\frac{c\sqrt{cx-1}\,\sqrt{cx+1}}{6\left(c^2d^2-e^2\right)(ex+d)^2}-\frac{c^3d\sqrt{cx-1}\,\sqrt{cx+1}}{2(dc-e)^2(dc+e)^2(ex+d)}$$

Result(type 3, 1107 leaves):

$$-\frac{c^3\operatorname{arccosh}(cx)}{3(cxe+dc)^3e}-\frac{c^7\sqrt{cx-1}\,\sqrt{cx+1}\,\ln\left(-\frac{2\left(xc^2d-\sqrt{c^2x^2-1}\,\sqrt{\frac{c^2d^2-e^2}{e^2}}\,e+e\right)}{cxe+dc}\right)x^2d^2}{3\sqrt{c^2x^2-1}\,(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)\sqrt{\frac{c^2d^2-e^2}{e^2}}\,(cxe+dc)^2}$$

$$-\frac{2c^7\sqrt{cx-1}\,\sqrt{cx+1}\,\ln\left(-\frac{2\left(xc^2d-\sqrt{c^2x^2-1}\,\sqrt{\frac{c^2d^2-e^2}{e^2}}\,e+e\right)}{cxe+dc}\right)xd^3}{3e\sqrt{c^2x^2-1}\,(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)\sqrt{\frac{c^2d^2-e^2}{e^2}}\,(cxe+dc)^2}-\frac{c^5e\sqrt{cx-1}\,\sqrt{cx+1}\,xd}{2(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)(cxe+dc)^2}$$

$$-\frac{c^5e^2\sqrt{cx-1}\,\sqrt{cx+1}\,\ln\left(-\frac{2\left(xc^2d-\sqrt{c^2x^2-1}\,\sqrt{\frac{c^2d^2-e^2}{e^2}}\,e+e\right)}{cxe+dc}\right)x^2}{6\sqrt{c^2x^2-1}\,(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)\sqrt{\frac{c^2d^2-e^2}{e^2}}\,(cxe+dc)^2}$$

$$-\frac{c^7\sqrt{cx-1}\,\sqrt{cx+1}\,\ln\left(-\frac{2\left(x c^2 d-\sqrt{c^2x^2-1}\,\sqrt{\frac{c^2d^2-e^2}{e^2}}\,e+e\right)}{cxe+dc}\right)d^4}{3e^2\sqrt{c^2x^2-1}\,(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)\sqrt{\frac{c^2d^2-e^2}{e^2}}\,(cxe+dc)^2}-\frac{2c^5\sqrt{cx-1}\,\sqrt{cx+1}\,d^2}{3\,(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)(cxe+dc)^2}$$

$$-\frac{c^5e\sqrt{cx-1}\,\sqrt{cx+1}\,\ln\left(-\frac{2\left(x c^2 d-\sqrt{c^2x^2-1}\,\sqrt{\frac{c^2d^2-e^2}{e^2}}\,e+e\right)}{cxe+dc}\right)xd}{3\sqrt{c^2x^2-1}\,(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)\sqrt{\frac{c^2d^2-e^2}{e^2}}\,(cxe+dc)^2}$$

$$-\frac{c^5\sqrt{cx-1}\,\sqrt{cx+1}\,\ln\left(-\frac{2\left(x c^2 d-\sqrt{c^2x^2-1}\,\sqrt{\frac{c^2d^2-e^2}{e^2}}\,e+e\right)}{cxe+dc}\right)d^2}{6\sqrt{c^2x^2-1}\,(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)\sqrt{\frac{c^2d^2-e^2}{e^2}}\,(cxe+dc)^2}+\frac{c^3e^2\sqrt{cx-1}\,\sqrt{cx+1}}{6\,(dc+e)\,(dc-e)\,\left(c^2d^2-e^2\right)(cxe+dc)^2}$$

Problem 5: Result more than twice size of optimal antiderivative.

$$\int (ex+d)^2\,(a+b\,\mathrm{arccosh}(cx))\,dx$$

Optimal(type 3, 115 leaves, 4 steps):

$$-\frac{bd\left(2d^2+\frac{3e^2}{c^2}\right)\mathrm{arccosh}(cx)}{6e}+\frac{(ex+d)^3\,(a+b\,\mathrm{arccosh}(cx))}{3e}-\frac{b\,(ex+d)^2\sqrt{cx-1}\,\sqrt{cx+1}}{9c}-\frac{b\left(5c^2dex+16c^2d^2+4e^2\right)\sqrt{cx-1}\,\sqrt{cx+1}}{18c^3}$$

Result(type 3, 273 leaves):

$$\frac{ae^2x^3}{3}+aex^2d+axd^2+\frac{ad^3}{3e}+\frac{be^2\,\mathrm{arccosh}(cx)\,x^3}{3}+be\,\mathrm{arccosh}(cx)\,x^2d+d^2b\,\mathrm{arccosh}(cx)\,x+\frac{b\,\mathrm{arccosh}(cx)\,d^3}{3e}$$
$$-\frac{b\sqrt{cx-1}\,\sqrt{cx+1}\,d^3\ln\left(cx+\sqrt{c^2x^2-1}\right)}{3e\sqrt{c^2x^2-1}}-\frac{be^2\sqrt{cx-1}\,\sqrt{cx+1}\,x^2}{9c}-\frac{be\sqrt{cx-1}\,\sqrt{cx+1}\,dx}{2c}-\frac{d^2b\sqrt{cx-1}\,\sqrt{cx+1}}{c}$$
$$-\frac{be\sqrt{cx-1}\,\sqrt{cx+1}\,d\ln\left(cx+\sqrt{c^2x^2-1}\right)}{2c^2\sqrt{c^2x^2-1}}-\frac{2be^2\sqrt{cx-1}\,\sqrt{cx+1}}{9c^3}$$

Problem 9: Result more than twice size of optimal antiderivative.

$$\int \frac{a+b\,\mathrm{arccosh}(cx)}{(ex+d)^3}\,dx$$

Optimal(type 3, 121 leaves, 4 steps):

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

Result(type 3, 360 leaves):

$$-\frac{c^2\,a}{2\,(c\,x\,e+d\,c)^2\,e}-\frac{c^2\,b\,\mathrm{arccosh}(c\,x)}{2\,(c\,x\,e+d\,c)^2\,e}-\frac{c^4\,b\sqrt{c\,x-1}\,\sqrt{c\,x+1}\,\ln\left(-\frac{2\left(x\,c^2\,d-\sqrt{c^2\,x^2-1}\,\sqrt{\frac{c^2\,d^2-e^2}{e^2}}\,e+e\right)}{c\,x\,e+d\,c}\right)x\,d}{2\,e\sqrt{c^2\,x^2-1}\,(d\,c+e)\,(d\,c-e)\,(c\,x\,e+d\,c)\sqrt{\frac{c^2\,d^2-e^2}{e^2}}}$$

$$-\frac{c^4\,b\sqrt{c\,x-1}\,\sqrt{c\,x+1}\,\ln\left(-\frac{2\left(x\,c^2\,d-\sqrt{c^2\,x^2-1}\,\sqrt{\frac{c^2\,d^2-e^2}{e^2}}\,e+e\right)}{c\,x\,e+d\,c}\right)d^2}{2\,e^2\sqrt{c^2\,x^2-1}\,(d\,c+e)\,(d\,c-e)\,(c\,x\,e+d\,c)\sqrt{\frac{c^2\,d^2-e^2}{e^2}}}-\frac{c^2\,b\sqrt{c\,x-1}\,\sqrt{c\,x+1}}{2\,(d\,c+e)\,(d\,c-e)\,(c\,x\,e+d\,c)}$$

Problem 15: Result is not expressed in closed-form.

$$\int\frac{\mathrm{arccosh}(a\,x)}{x^2\,d+c}\,dx$$

Optimal(type 4, 489 leaves, 18 steps):

$$\frac{\mathrm{arccosh}(a\,x)\,\ln\left(1-\frac{\left(a\,x+\sqrt{a\,x-1}\,\sqrt{a\,x+1}\right)\sqrt{d}}{a\sqrt{-c}-\sqrt{-a^2\,c-d}}\right)}{2\sqrt{-c}\,\sqrt{d}}-\frac{\mathrm{arccosh}(a\,x)\,\ln\left(1+\frac{\left(a\,x+\sqrt{a\,x-1}\,\sqrt{a\,x+1}\right)\sqrt{d}}{a\sqrt{-c}-\sqrt{-a^2\,c-d}}\right)}{2\sqrt{-c}\,\sqrt{d}}$$

$$+\frac{\mathrm{arccosh}(a\,x)\,\ln\left(1-\frac{\left(a\,x+\sqrt{a\,x-1}\,\sqrt{a\,x+1}\right)\sqrt{d}}{a\sqrt{-c}+\sqrt{-a^2\,c-d}}\right)}{2\sqrt{-c}\,\sqrt{d}}-\frac{\mathrm{arccosh}(a\,x)\,\ln\left(1+\frac{\left(a\,x+\sqrt{a\,x-1}\,\sqrt{a\,x+1}\right)\sqrt{d}}{a\sqrt{-c}+\sqrt{-a^2\,c-d}}\right)}{2\sqrt{-c}\,\sqrt{d}}$$

$$-\frac{\mathrm{polylog}\left(2,-\frac{\left(a\,x+\sqrt{a\,x-1}\,\sqrt{a\,x+1}\right)\sqrt{d}}{a\sqrt{-c}-\sqrt{-a^2\,c-d}}\right)}{2\sqrt{-c}\,\sqrt{d}}+\frac{\mathrm{polylog}\left(2,\frac{\left(a\,x+\sqrt{a\,x-1}\,\sqrt{a\,x+1}\right)\sqrt{d}}{a\sqrt{-c}-\sqrt{-a^2\,c-d}}\right)}{2\sqrt{-c}\,\sqrt{d}}$$

$$-\frac{\mathrm{polylog}\left(2,-\frac{\left(a\,x+\sqrt{a\,x-1}\,\sqrt{a\,x+1}\right)\sqrt{d}}{a\sqrt{-c}+\sqrt{-a^2\,c-d}}\right)}{2\sqrt{-c}\,\sqrt{d}}+\frac{\mathrm{polylog}\left(2,\frac{\left(a\,x+\sqrt{a\,x-1}\,\sqrt{a\,x+1}\right)\sqrt{d}}{a\sqrt{-c}+\sqrt{-a^2\,c-d}}\right)}{2\sqrt{-c}\,\sqrt{d}}$$

Result(type 7, 213 leaves):

$$\frac{a\left(\sum_{\_R1=RootOf(d\_Z^4+(4a^2c+2d)\_Z^2+d)}\frac{\_R1\left(\operatorname{arccosh}(ax)\ln\left(\frac{\_R1-ax-\sqrt{ax-1}\sqrt{ax+1}}{\_R1}\right)+\operatorname{dilog}\left(\frac{\_R1-ax-\sqrt{ax-1}\sqrt{ax+1}}{\_R1}\right)\right)}{\_R1^2 d+2a^2c+d}\right)}{2}$$

$$-\frac{a\left(\sum_{\_R1=RootOf(d\_Z^4+(4a^2c+2d)\_Z^2+d)}\frac{\operatorname{arccosh}(ax)\ln\left(\frac{\_R1-ax-\sqrt{ax-1}\sqrt{ax+1}}{\_R1}\right)+\operatorname{dilog}\left(\frac{\_R1-ax-\sqrt{ax-1}\sqrt{ax+1}}{\_R1}\right)}{\_R1\left(\_R1^2 d+2a^2c+d\right)}\right)}{2}$$

Problem 17: Unable to integrate problem.

$$\int\frac{\operatorname{arccosh}(ax)}{(x^2d+c)^{3/2}}\,dx$$

Optimal(type 3, 80 leaves, 7 steps):

$$-\frac{\operatorname{arctanh}\left(\frac{\sqrt{d}\sqrt{a^2x^2-1}}{a\sqrt{x^2d+c}}\right)\sqrt{a^2x^2-1}}{c\sqrt{d}\sqrt{ax-1}\sqrt{ax+1}}+\frac{x\operatorname{arccosh}(ax)}{c\sqrt{x^2d+c}}$$

Result(type 8, 16 leaves):

$$\int\frac{\operatorname{arccosh}(ax)}{(x^2d+c)^{3/2}}\,dx$$

Problem 21: Result more than twice size of optimal antiderivative.

$$\int\frac{(-c^2dx^2+d)^{5/2}(a+b\operatorname{arccosh}(cx))}{gx+f}\,dx$$

Optimal(type 4, 1608 leaves, 39 steps):

$$-\frac{d^2(c^2f^2-g^2)^2(-c^2x^2+1)(a+b\operatorname{arccosh}(cx))^2\sqrt{-c^2dx^2+d}}{2bcg^4(gx+f)\sqrt{cx-1}\sqrt{cx+1}}+\frac{bc^3d^2f(c^2f^2-2g^2)x^2\sqrt{-c^2dx^2+d}}{4g^4\sqrt{cx-1}\sqrt{cx+1}}$$

$$+\frac{cd^2f(c^2f^2-2g^2)(a+b\operatorname{arccosh}(cx))^2\sqrt{-c^2dx^2+d}}{4bg^4\sqrt{cx-1}\sqrt{cx+1}}-\frac{cd^2(c^2f^2-g^2)^2x(a+b\operatorname{arccosh}(cx))^2\sqrt{-c^2dx^2+d}}{2bg^5\sqrt{cx-1}\sqrt{cx+1}}$$

$$-\frac{d^2(c^2f^2-g^2)^3(a+b\operatorname{arccosh}(cx))^2\sqrt{-c^2dx^2+d}}{2bcg^6(gx+f)\sqrt{cx-1}\sqrt{cx+1}}+\frac{c^2d^2fx(a+b\operatorname{arccosh}(cx))\sqrt{-c^2dx^2+d}}{8g^2}-\frac{c^4d^2fx^3(a+b\operatorname{arccosh}(cx))\sqrt{-c^2dx^2+d}}{4g^2}$$

$$-\frac{d^2(c^2f^2-2g^2)(-cx+1)(cx+1)(a+b\operatorname{arccosh}(cx))\sqrt{-c^2dx^2+d}}{3g^3}+\frac{bd^2(c^2f^2-g^2)^2\operatorname{arccosh}(cx)\sqrt{-c^2dx^2+d}}{g^5}$$

$$- \frac{2 d^2 (-cx+1)(cx+1)(a+b\,\mathrm{arccosh}(cx))\sqrt{-c^2 d x^2+d}}{15 g} + \frac{a d^2 (c^2 f^2-g^2)^2 (-c^2x^2+1)\sqrt{-c^2 d x^2+d}}{g^5 (-cx+1)(cx+1)}$$

$$- \frac{c^2 d^2 f(c^2 f^2-2g^2)\, x\,(a+b\,\mathrm{arccosh}(cx))\sqrt{-c^2 d x^2+d}}{2 g^4} - \frac{c^2 d^2 x^2 (-cx+1)(cx+1)(a+b\,\mathrm{arccosh}(cx))\sqrt{-c^2 d x^2+d}}{5 g}$$

$$+ \frac{2 b c d^2 x\sqrt{-c^2 d x^2+d}}{15 g\sqrt{cx-1}\,\sqrt{cx+1}} + \frac{b c^3 d^2 x^3\sqrt{-c^2 d x^2+d}}{45 g\sqrt{cx-1}\,\sqrt{cx+1}} - \frac{b c^5 d^2 x^5\sqrt{-c^2 d x^2+d}}{25 g\sqrt{cx-1}\,\sqrt{cx+1}}$$

$$+ \frac{b d^2 (c^2 f^2-g^2)^{5/2}\,\mathrm{polylog}\left(2, -\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right) g}{fc-\sqrt{c^2f^2-g^2}}\right)\sqrt{-c^2 d x^2+d}}{g^6\sqrt{cx-1}\,\sqrt{cx+1}}$$

$$- \frac{b d^2 (c^2 f^2-g^2)^{5/2}\,\mathrm{polylog}\left(2, -\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right) g}{fc+\sqrt{c^2f^2-g^2}}\right)\sqrt{-c^2 d x^2+d}}{g^6\sqrt{cx-1}\,\sqrt{cx+1}} + \frac{b c d^2 (c^2f^2-2g^2)\, x\sqrt{-c^2 d x^2+d}}{3 g^3\sqrt{cx-1}\,\sqrt{cx+1}}$$

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

$$+ \frac{c d^2 f (a+b\,\mathrm{arccosh}(cx))^2\sqrt{-c^2 d x^2+d}}{16 b g^2\sqrt{cx-1}\,\sqrt{cx+1}} + \frac{b d^2 (c^2 f^2-g^2)^{5/2}\,\mathrm{arccosh}(cx)\ln\left(1+\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right) g}{fc-\sqrt{c^2f^2-g^2}}\right)\sqrt{-c^2 d x^2+d}}{g^6\sqrt{cx-1}\,\sqrt{cx+1}}$$

$$- \frac{b d^2 (c^2 f^2-g^2)^{5/2}\,\mathrm{arccosh}(cx)\ln\left(1+\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right) g}{fc+\sqrt{c^2f^2-g^2}}\right)\sqrt{-c^2 d x^2+d}}{g^6\sqrt{cx-1}\,\sqrt{cx+1}}$$

$$- \frac{a d^2 (c^2 f^2-g^2)^{5/2}\,\mathrm{arctanh}\left(\frac{c^2 f x+g}{\sqrt{c^2f^2-g^2}\,\sqrt{c^2x^2-1}}\right)\sqrt{c^2x^2-1}\,\sqrt{-c^2 d x^2+d}}{g^6 (-cx+1)(cx+1)}$$

```
Result(type ?, 4233 leaves): Display of huge result suppressed!
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Problem 22: Result more than twice size of optimal antiderivative.
```

$$\int \frac{(gx+f)^3 (a+b\,\mathrm{arccosh}(cx))}{\sqrt{-c^2 d x^2+d}}\, dx$$

```
Optimal(type 3, 418 leaves, 13 steps):
```

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

$$-\frac{g^3 x^2 (-cx+1)(cx+1)(a+b\operatorname{arccosh}(cx))}{3c^2\sqrt{-c^2dx^2+d}}-\frac{3bf^2gx\sqrt{cx-1}\sqrt{cx+1}}{c\sqrt{-c^2dx^2+d}}-\frac{2bg^3x\sqrt{cx-1}\sqrt{cx+1}}{3c^3\sqrt{-c^2dx^2+d}}-\frac{3bfg^2x^2\sqrt{cx-1}\sqrt{cx+1}}{4c\sqrt{-c^2dx^2+d}}$$
$$-\frac{bg^3x^3\sqrt{cx-1}\sqrt{cx+1}}{9c\sqrt{-c^2dx^2+d}}+\frac{f^3(a+b\operatorname{arccosh}(cx))^2\sqrt{cx-1}\sqrt{cx+1}}{2bc\sqrt{-c^2dx^2+d}}+\frac{3fg^2(a+b\operatorname{arccosh}(cx))^2\sqrt{cx-1}\sqrt{cx+1}}{4bc^3\sqrt{-c^2dx^2+d}}$$

```
Result(type 3, 858 leaves):
```

$$\frac{af^3\arctan\left(\frac{\sqrt{c^2d}\,x}{\sqrt{-c^2dx^2+d}}\right)}{\sqrt{c^2d}}-\frac{ag^3x^2\sqrt{-c^2dx^2+d}}{3c^2d}-\frac{2ag^3\sqrt{-c^2dx^2+d}}{3dc^4}-\frac{3afg^2x\sqrt{-c^2dx^2+d}}{2c^2d}+\frac{3afg^2\arctan\left(\frac{\sqrt{c^2d}\,x}{\sqrt{-c^2dx^2+d}}\right)}{2c^2\sqrt{c^2d}}$$
$$-\frac{3af^2g\sqrt{-c^2dx^2+d}}{c^2d}+\frac{2b\sqrt{-d(c^2x^2-1)}\,g^3\operatorname{arccosh}(cx)}{3c^4d(c^2x^2-1)}-\frac{b\sqrt{-d(c^2x^2-1)}\sqrt{cx-1}\sqrt{cx+1}\operatorname{arccosh}(cx)^2f^3}{2dc(c^2x^2-1)}$$
$$+\frac{b\sqrt{-d(c^2x^2-1)}\,g^3\sqrt{cx+1}\sqrt{cx-1}\,x^3}{9cd(c^2x^2-1)}+\frac{2b\sqrt{-d(c^2x^2-1)}\,g^3\sqrt{cx-1}\sqrt{cx+1}\,x}{3c^3d(c^2x^2-1)}-\frac{3b\sqrt{-d(c^2x^2-1)}\,g^2f\operatorname{arccosh}(cx)\,x^3}{2d(c^2x^2-1)}$$
$$+\frac{3b\sqrt{-d(c^2x^2-1)}\,g^2f\operatorname{arccosh}(cx)\,x}{2dc^2(c^2x^2-1)}-\frac{3b\sqrt{-d(c^2x^2-1)}\,g^2f\sqrt{cx-1}\sqrt{cx+1}}{8dc^3(c^2x^2-1)}-\frac{3b\sqrt{-d(c^2x^2-1)}\,g\operatorname{arccosh}(cx)\,x^2f^2}{d(c^2x^2-1)}$$
$$-\frac{3b\sqrt{-d(c^2x^2-1)}\sqrt{cx-1}\sqrt{cx+1}\operatorname{arccosh}(cx)^2fg^2}{4dc^3(c^2x^2-1)}-\frac{b\sqrt{-d(c^2x^2-1)}\,g^3\operatorname{arccosh}(cx)\,x^4}{3d(c^2x^2-1)}-\frac{b\sqrt{-d(c^2x^2-1)}\,g^3\operatorname{arccosh}(cx)\,x^2}{3c^2d(c^2x^2-1)}$$
$$+\frac{3b\sqrt{-d(c^2x^2-1)}\,g\operatorname{arccosh}(cx)f^2}{c^2d(c^2x^2-1)}+\frac{3b\sqrt{-d(c^2x^2-1)}\,g^2f\sqrt{cx+1}\sqrt{cx-1}\,x^2}{4dc(c^2x^2-1)}+\frac{3b\sqrt{-d(c^2x^2-1)}\,g\sqrt{cx-1}\sqrt{cx+1}\,xf^2}{cd(c^2x^2-1)}$$

```
Problem 23: Result more than twice size of optimal antiderivative.
```

$$\int\frac{a+b\operatorname{arccosh}(cx)}{(gx+f)^2\sqrt{-c^2dx^2+d}}\,dx$$

```
Optimal(type 4, 519 leaves, 13 steps):
```

$$-\frac{g(cx+1)^{3/2}(a+b\operatorname{arccosh}(cx))\sqrt{cx-1}\sqrt{\frac{cx-1}{cx+1}}}{(c^2f^2-g^2)(gx+f)\sqrt{-c^2dx^2+d}}+\frac{bc\ln(gx+f)\sqrt{cx-1}\sqrt{cx+1}}{(c^2f^2-g^2)\sqrt{-c^2dx^2+d}}$$
$$+\frac{c^2f(a+b\operatorname{arccosh}(cx))\ln\left(1+\frac{\left(cx+\sqrt{cx-1}\sqrt{cx+1}\right)g}{fc-\sqrt{c^2f^2-g^2}}\right)\sqrt{cx-1}\sqrt{cx+1}}{(c^2f^2-g^2)^{3/2}\sqrt{-c^2dx^2+d}}$$

$$-\frac{c^2 f(a+b\operatorname{arccosh}(cx))\ln\left(1+\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc+\sqrt{c^2f^2-g^2}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{(c^2f^2-g^2)^{3/2}\sqrt{-c^2dx^2+d}}$$

$$+\frac{b\,c^2 f\operatorname{polylog}\left(2,-\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc-\sqrt{c^2f^2-g^2}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{(c^2f^2-g^2)^{3/2}\sqrt{-c^2dx^2+d}}-\frac{b\,c^2 f\operatorname{polylog}\left(2,-\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc+\sqrt{c^2f^2-g^2}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{(c^2f^2-g^2)^{3/2}\sqrt{-c^2dx^2+d}}$$

```
Result(type 4, 1977 leaves):
```

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

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

$$-\frac{b\sqrt{-d(c^2x^2-1)}\operatorname{arccosh}(cx)(cx-1)(cx+1)xc^2f}{d(c^2x^2-1)(c^2f^2-g^2)(gx+f)}+\frac{b\sqrt{-d(c^2x^2-1)}\operatorname{arccosh}(cx)x^3c^4f}{d(c^2x^2-1)(c^2f^2-g^2)(gx+f)}$$

$$-\frac{b\sqrt{-d(c^2x^2-1)}\operatorname{arccosh}(cx)\sqrt{cx-1}\,\sqrt{cx+1}\,xcg}{d(c^2x^2-1)(c^2f^2-g^2)(gx+f)}+\frac{b\sqrt{-d(c^2x^2-1)}\operatorname{arccosh}(cx)x^2c^2g}{d(c^2x^2-1)(c^2f^2-g^2)(gx+f)}$$

$$-\frac{b\sqrt{-d(c^2x^2-1)}\operatorname{arccosh}(cx)\sqrt{cx-1}\,\sqrt{cx+1}\,cf}{d(c^2x^2-1)(c^2f^2-g^2)(gx+f)}-\frac{b\sqrt{-d(c^2x^2-1)}\operatorname{arccosh}(cx)xc^2f}{d(c^2x^2-1)(c^2f^2-g^2)(gx+f)}-\frac{b\sqrt{-d(c^2x^2-1)}\operatorname{arccosh}(cx)g}{d(c^2x^2-1)(c^2f^2-g^2)(gx+f)}$$

$$-\frac{b\sqrt{-d(c^2x^2-1)}\sqrt{cx-1}\,\sqrt{cx+1}\,c^2f\operatorname{arccosh}(cx)\sqrt{c^2f^2-g^2}\ln\left(\frac{-\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g-fc+\sqrt{c^2f^2-g^2}}{-fc+\sqrt{c^2f^2-g^2}}\right)}{d(c^6f^4x^2-2c^4f^2g^2x^2-c^4f^4+c^2g^4x^2+2c^2f^2g^2-g^4)}$$

$$+\frac{b\sqrt{-d(c^2x^2-1)}\sqrt{cx-1}\,\sqrt{cx+1}\,c^2f\operatorname{arccosh}(cx)\sqrt{c^2f^2-g^2}\ln\left(\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g+fc+\sqrt{c^2f^2-g^2}}{fc+\sqrt{c^2f^2-g^2}}\right)}{d(c^6f^4x^2-2c^4f^2g^2x^2-c^4f^4+c^2g^4x^2+2c^2f^2g^2-g^4)}$$

$$+\frac{2b\sqrt{-d(c^2x^2-1)}\sqrt{cx-1}\,\sqrt{cx+1}\,c^3\ln\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)f^2}{d(c^6f^4x^2-2c^4f^2g^2x^2-c^4f^4+c^2g^4x^2+2c^2f^2g^2-g^4)}$$

$$-\frac{b\sqrt{-d\left(c^{2}x^{2}-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\,c^{3}\ln\left(\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)^{2}g+2fc\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)+g\right)f^{2}}{d\left(c^{6}f^{4}x^{2}-2c^{4}f^{2}g^{2}x^{2}-c^{4}f^{4}+c^{2}g^{4}x^{2}+2c^{2}f^{2}g^{2}-g^{4}\right)}$$

$$-\frac{b\sqrt{-d\left(c^{2}x^{2}-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\,c^{2}f\sqrt{c^{2}f^{2}-g^{2}}\,\mathrm{dilog}\left(\frac{-\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g-fc+\sqrt{c^{2}f^{2}-g^{2}}}{-fc+\sqrt{c^{2}f^{2}-g^{2}}}\right)}{d\left(c^{6}f^{4}x^{2}-2c^{4}f^{2}g^{2}x^{2}-c^{4}f^{4}+c^{2}g^{4}x^{2}+2c^{2}f^{2}g^{2}-g^{4}\right)}$$

$$+\frac{b\sqrt{-d\left(c^{2}x^{2}-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\,c^{2}f\sqrt{c^{2}f^{2}-g^{2}}\,\mathrm{dilog}\left(\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g+fc+\sqrt{c^{2}f^{2}-g^{2}}}{fc+\sqrt{c^{2}f^{2}-g^{2}}}\right)}{d\left(c^{6}f^{4}x^{2}-2c^{4}f^{2}g^{2}x^{2}-c^{4}f^{4}+c^{2}g^{4}x^{2}+2c^{2}f^{2}g^{2}-g^{4}\right)}$$

$$-\frac{2b\sqrt{-d\left(c^{2}x^{2}-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\,c\ln\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g^{2}}{d\left(c^{6}f^{4}x^{2}-2c^{4}f^{2}g^{2}x^{2}-c^{4}f^{4}+c^{2}g^{4}x^{2}+2c^{2}f^{2}g^{2}-g^{4}\right)}$$

$$+\frac{b\sqrt{-d\left(c^{2}x^{2}-1\right)}\,\sqrt{cx-1}\,\sqrt{cx+1}\,c\ln\left(\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)^{2}g+2fc\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)+g\right)g^{2}}{d\left(c^{6}f^{4}x^{2}-2c^{4}f^{2}g^{2}x^{2}-c^{4}f^{4}+c^{2}g^{4}x^{2}+2c^{2}f^{2}g^{2}-g^{4}\right)}$$

Problem 24: Unable to integrate problem.

$$\int\frac{\left(a+b\,\mathrm{arccosh}(cx)\right)\ln\left(h\left(gx+f\right)^{m}\right)}{\sqrt{-c^{2}x^{2}+1}}\,dx$$

Optimal(type 4, 610 leaves, 12 steps):

$$\frac{m\left(a+b\,\mathrm{arccosh}(cx)\right)^{3}\sqrt{cx-1}\,\sqrt{cx+1}}{6b^{2}c\sqrt{-c^{2}x^{2}+1}}+\frac{\left(a+b\,\mathrm{arccosh}(cx)\right)^{2}\ln\left(h\left(gx+f\right)^{m}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{2bc\sqrt{-c^{2}x^{2}+1}}$$

$$-\frac{m\left(a+b\,\mathrm{arccosh}(cx)\right)^{2}\ln\left(1+\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc-\sqrt{c^{2}f^{2}-g^{2}}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{2bc\sqrt{-c^{2}x^{2}+1}}$$

$$-\frac{m\left(a+b\,\mathrm{arccosh}(cx)\right)^{2}\ln\left(1+\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc+\sqrt{c^{2}f^{2}-g^{2}}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{2bc\sqrt{-c^{2}x^{2}+1}}$$

$$-\frac{m\left(a+b\,\mathrm{arccosh}(cx)\right)\mathrm{polylog}\left(2,-\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc-\sqrt{c^{2}f^{2}-g^{2}}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c\sqrt{-c^{2}x^{2}+1}}$$

$$-\frac{m\left(a+b\operatorname{arccosh}(cx)\right)\operatorname{polylog}\left(2,-\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc+\sqrt{c^2f^2-g^2}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c\sqrt{-c^2x^2+1}}$$
$$+\frac{b\,m\operatorname{polylog}\left(3,-\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc-\sqrt{c^2f^2-g^2}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c\sqrt{-c^2x^2+1}}+\frac{b\,m\operatorname{polylog}\left(3,-\frac{\left(cx+\sqrt{cx-1}\,\sqrt{cx+1}\right)g}{fc+\sqrt{c^2f^2-g^2}}\right)\sqrt{cx-1}\,\sqrt{cx+1}}{c\sqrt{-c^2x^2+1}}$$

Result(type 8, 33 leaves):

$$\int\frac{\left(a+b\operatorname{arccosh}(cx)\right)\ln\left(h\left(gx+f\right)^m\right)}{\sqrt{-c^2x^2+1}}\,dx$$

Problem 25: Unable to integrate problem.

$$\int\frac{\ln\left(h\left(gx+f\right)^m\right)}{\sqrt{-c^2x^2+1}}\,dx$$

Optimal(type 4, 252 leaves, 9 steps):

$$\frac{\mathrm{I}\,m\arcsin(cx)^2}{2c}+\frac{\arcsin(cx)\ln\left(h\left(gx+f\right)^m\right)}{c}-\frac{m\arcsin(cx)\ln\left(1-\frac{\mathrm{I}\left(\mathrm{I}\,cx+\sqrt{-c^2x^2+1}\right)g}{fc-\sqrt{c^2f^2-g^2}}\right)}{c}-\frac{m\arcsin(cx)\ln\left(1-\frac{\mathrm{I}\left(\mathrm{I}\,cx+\sqrt{-c^2x^2+1}\right)g}{fc+\sqrt{c^2f^2-g^2}}\right)}{c}$$
$$+\frac{\mathrm{I}\,m\operatorname{polylog}\left(2,\frac{\mathrm{I}\left(\mathrm{I}\,cx+\sqrt{-c^2x^2+1}\right)g}{fc-\sqrt{c^2f^2-g^2}}\right)}{c}+\frac{\mathrm{I}\,m\operatorname{polylog}\left(2,\frac{\mathrm{I}\left(\mathrm{I}\,cx+\sqrt{-c^2x^2+1}\right)g}{fc+\sqrt{c^2f^2-g^2}}\right)}{c}$$

Result(type 8, 25 leaves):

$$\int\frac{\ln\left(h\left(gx+f\right)^m\right)}{\sqrt{-c^2x^2+1}}\,dx$$

Problem 26: Unable to integrate problem.

$$\int\frac{1}{\sqrt{a+b\operatorname{arccosh}(dx+c)}}\,dx$$

Optimal(type 4, 71 leaves, 7 steps):

$$-\frac{e^{\frac{a}{b}}\operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{2d\sqrt{b}}+\frac{\operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{2d\,e^{\frac{a}{b}}\sqrt{b}}$$

Result(type 8, 14 leaves):

$$\int\frac{1}{\sqrt{a+b\operatorname{arccosh}(dx+c)}}\,dx$$

Problem 27: Unable to integrate problem.

$$\int\frac{1}{\sqrt{a-b\operatorname{arccosh}(dx+c)}}\,dx$$

Optimal(type 4, 73 leaves, 7 steps):

$$-\frac{e^{\frac{a}{b}}\operatorname{erf}\left(\frac{\sqrt{a-b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{2d\sqrt{b}}+\frac{\operatorname{erfi}\left(\frac{\sqrt{a-b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{2d\,e^{\frac{a}{b}}\sqrt{b}}$$

Result(type 8, 15 leaves):

$$\int\frac{1}{\sqrt{a-b\operatorname{arccosh}(dx+c)}}\,dx$$

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

$$\int\frac{(a+b\operatorname{arccosh}(dx+c))^3}{dex+ce}\,dx$$

Optimal(type 4, 207 leaves, 9 steps):

$$\frac{(a+b\operatorname{arccosh}(dx+c))^4}{4bde}+\frac{(a+b\operatorname{arccosh}(dx+c))^3\ln\left(1+\frac{1}{\left(dx+c+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)^2}\right)}{de}$$
$$-\frac{3b\,(a+b\operatorname{arccosh}(dx+c))^2\operatorname{polylog}\left(2,-\frac{1}{\left(dx+c+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)^2}\right)}{2de}$$
$$-\frac{3b^2\,(a+b\operatorname{arccosh}(dx+c))\operatorname{polylog}\left(3,-\frac{1}{\left(dx+c+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)^2}\right)}{2de}$$

$$- \frac{3 b^3 \operatorname{polylog}\left(4, -\frac{1}{\left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2}\right)}{4 d e}$$

Result(type 4, 470 leaves):

$$\frac{a^3 \ln(d x + c)}{d e} - \frac{b^3 \operatorname{arccosh}(d x + c)^4}{4 d e} + \frac{b^3 \operatorname{arccosh}(d x + c)^3 \ln\left(1 + \left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{d e}$$
$$+ \frac{3 b^3 \operatorname{arccosh}(d x + c)^2 \operatorname{polylog}\left(2, -\left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{2 d e}$$
$$- \frac{3 b^3 \operatorname{arccosh}(d x + c) \operatorname{polylog}\left(3, -\left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{2 d e} + \frac{3 b^3 \operatorname{polylog}\left(4, -\left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{4 d e}$$
$$- \frac{a b^2 \operatorname{arccosh}(d x + c)^3}{d e} + \frac{3 a b^2 \operatorname{arccosh}(d x + c)^2 \ln\left(1 + \left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{d e}$$
$$+ \frac{3 a b^2 \operatorname{arccosh}(d x + c) \operatorname{polylog}\left(2, -\left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{d e} - \frac{3 a b^2 \operatorname{polylog}\left(3, -\left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{2 d e}$$
$$- \frac{3 b a^2 \operatorname{arccosh}(d x + c)^2}{2 d e} + \frac{3 b a^2 \operatorname{arccosh}(d x + c) \ln\left(1 + \left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{d e}$$
$$+ \frac{3 b a^2 \operatorname{polylog}\left(2, -\left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)^2\right)}{2 d e}$$

Problem 34: Unable to integrate problem.

$$\int \frac{(a + b \operatorname{arccosh}(d x + c))^3}{(d e x + c e)^2}\, dx$$

Optimal(type 4, 248 leaves, 11 steps):

$$- \frac{(a + b \operatorname{arccosh}(d x + c))^3}{d e^2 (d x + c)} + \frac{6 b (a + b \operatorname{arccosh}(d x + c))^2 \arctan\left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)}{d e^2}$$
$$- \frac{6 I b^2 (a + b \operatorname{arccosh}(d x + c)) \operatorname{polylog}\left(2, -I \left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)\right)}{d e^2}$$
$$+ \frac{6 I b^2 (a + b \operatorname{arccosh}(d x + c)) \operatorname{polylog}\left(2, I \left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)\right)}{d e^2} + \frac{6 I b^3 \operatorname{polylog}\left(3, -I \left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)\right)}{d e^2}$$
$$- \frac{6 I b^3 \operatorname{polylog}\left(3, I \left(d x + c + \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\right)\right)}{d e^2}$$

Result(type 8, 25 leaves):

$$\int \frac{(a + b \operatorname{arccosh}(d x + c))^3}{(d e x + c e)^2}\, dx$$

Problem 35: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 180 leaves, 9 steps):

$$-\frac{3 b (a+b\,\mathrm{arccosh}(d x+c))^2}{2 d e^3}-\frac{(a+b\,\mathrm{arccosh}(d x+c))^3}{2 d e^3 (d x+c)^2}-\frac{3 b^2 (a+b\,\mathrm{arccosh}(d x+c)) \ln\left(1+\frac{1}{\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2}\right)}{d e^3}+\frac{3 b^3 \,\mathrm{polylog}\left(2,-\frac{1}{\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2}\right)}{2 d e^3}+\frac{3 b (a+b\,\mathrm{arccosh}(d x+c))^2 \sqrt{d x+c-1}\,\sqrt{d x+c+1}}{2 d e^3 (d x+c)}$$

Result(type 4, 374 leaves):

$$-\frac{a^3}{2 d e^3 (d x+c)^2}+\frac{3 b^3 \,\mathrm{arccosh}(d x+c)^2 \sqrt{d x+c-1}\,\sqrt{d x+c+1}}{2 d e^3 (d x+c)}+\frac{3 b^3 \,\mathrm{arccosh}(d x+c)^2}{2 d e^3}-\frac{b^3 \,\mathrm{arccosh}(d x+c)^3}{2 d e^3 (d x+c)^2}-\frac{3 b^3 \,\mathrm{arccosh}(d x+c) \ln\left(1+\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e^3}-\frac{3 b^3 \,\mathrm{polylog}\left(2,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{2 d e^3}+\frac{3 a b^2 \,\mathrm{arccosh}(d x+c)}{d e^3}+\frac{3 a b^2 \,\mathrm{arccosh}(d x+c) \sqrt{d x+c-1}\,\sqrt{d x+c+1}}{d e^3 (d x+c)}-\frac{3 a b^2 \,\mathrm{arccosh}(d x+c)^2}{2 d e^3 (d x+c)^2}-\frac{3 a b^2 \ln\left(1+\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e^3}-\frac{3 b a^2 \,\mathrm{arccosh}(d x+c)}{2 d e^3 (d x+c)^2}+\frac{3 b a^2 \sqrt{d x+c-1}\,\sqrt{d x+c+1}}{2 d e^3 (d x+c)}$$

Problem 36: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 339 leaves, 16 steps):

$$\frac{45 b^4 e^3 (d x+c)^2}{128 d}+\frac{3 b^4 e^3 (d x+c)^4}{128 d}-\frac{45 b^2 e^3 (a+b\,\mathrm{arccosh}(d x+c))^2}{128 d}+\frac{9 b^2 e^3 (d x+c)^2 (a+b\,\mathrm{arccosh}(d x+c))^2}{16 d}+\frac{3 b^2 e^3 (d x+c)^4 (a+b\,\mathrm{arccosh}(d x+c))^2}{16 d}-\frac{3 e^3 (a+b\,\mathrm{arccosh}(d x+c))^4}{32 d}+\frac{e^3 (d x+c)^4 (a+b\,\mathrm{arccosh}(d x+c))^4}{4 d}-\frac{45 b^3 e^3 (d x+c) (a+b\,\mathrm{arccosh}(d x+c)) \sqrt{d x+c-1}\,\sqrt{d x+c+1}}{64 d}-\frac{3 b^3 e^3 (d x+c)^3 (a+b\,\mathrm{arccosh}(d x+c)) \sqrt{d x+c-1}\,\sqrt{d x+c+1}}{32 d}-\frac{3 b e^3 (d x+c) (a+b\,\mathrm{arccosh}(d x+c))^3 \sqrt{d x+c-1}\,\sqrt{d x+c+1}}{8 d}-\frac{b e^3 (d x+c)^3 (a+b\,\mathrm{arccosh}(d x+c))^3 \sqrt{d x+c-1}\,\sqrt{d x+c+1}}{4 d}$$

Result(type ?, 2464 leaves): Display of huge result suppressed!

Problem 37: Result more than twice size of optimal antiderivative.

$$\int (d e x + c e)\ (a + b \operatorname{arccosh}(d x + c))^4\, dx$$

Optimal(type 3, 189 leaves, 9 steps):

$$\frac{3 b^4 e (d x + c)^2}{4 d} - \frac{3 b^2 e (a + b \operatorname{arccosh}(d x + c))^2}{4 d} + \frac{3 b^2 e (d x + c)^2 (a + b \operatorname{arccosh}(d x + c))^2}{2 d} - \frac{e (a + b \operatorname{arccosh}(d x + c))^4}{4 d} + \frac{e (d x + c)^2 (a + b \operatorname{arccosh}(d x + c))^4}{2 d} - \frac{3 b^3 e (d x + c) (a + b \operatorname{arccosh}(d x + c)) \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}}{2 d} - \frac{b e (d x + c) (a + b \operatorname{arccosh}(d x + c))^3 \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}}{d}$$

Result(type 3, 932 leaves):

$$\frac{2 \operatorname{arccosh}(d x + c)\, a^3 b c^2 e}{d} - e b^4 \operatorname{arccosh}(d x + c)^3 \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, x - \frac{3 e b^4 \operatorname{arccosh}(d x + c) \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, x}{2} + 4 e a b^3 \operatorname{arccosh}(d x + c)^3 x c + 6 e a b^3 \operatorname{arccosh}(d x + c)\, x c - \frac{3 e a b^3 \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, x}{2} + 6 e a^2 b^2 \operatorname{arccosh}(d x + c)^2 x c - \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, x a^3 b e + 4 \operatorname{arccosh}(d x + c)\, x a^3 b c e + 3 d e a^2 b^2 \operatorname{arccosh}(d x + c)^2 x^2 + 2 d \operatorname{arccosh}(d x + c)\, x^2 a^3 b e + 2 d e a b^3 \operatorname{arccosh}(d x + c)^3 x^2 + 3 d e a b^3 \operatorname{arccosh}(d x + c)\, x^2 + \frac{2 e a b^3 \operatorname{arccosh}(d x + c)^3 c^2}{d} + \frac{3 e a b^3 \operatorname{arccosh}(d x + c)\, c^2}{d} + \frac{3 e a^2 b^2 \operatorname{arccosh}(d x + c)^2 c^2}{d} + \frac{d x^2 a^4 e}{2} + \frac{3 d e b^4 x^2}{4} - \frac{e b^4 \operatorname{arccosh}(d x + c)^4}{4 d} - \frac{3 e b^4 \operatorname{arccosh}(d x + c)^2}{4 d} + x a^4 c e + \frac{3 e b^4 x c}{2} + \frac{a^4 c^2 e}{2 d} + \frac{3 e b^4 c^2}{4 d} - \frac{3 e a^2 b^2 \operatorname{arccosh}(d x + c) \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, c}{d} - \frac{e a^3 b \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, \ln\left(d x + c + \sqrt{(d x + c)^2 - 1}\right)}{d \sqrt{(d x + c)^2 - 1}} - \frac{3 e a b^3 \operatorname{arccosh}(d x + c)^2 \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, c}{d} + 3 e b^4 \operatorname{arccosh}(d x + c)^2 x c + \frac{e b^4 \operatorname{arccosh}(d x + c)^4 c^2}{2 d} + \frac{3 e b^4 \operatorname{arccosh}(d x + c)^2 c^2}{2 d} - \frac{e a b^3 \operatorname{arccosh}(d x + c)^3}{d} - \frac{3 e a b^3 \operatorname{arccosh}(d x + c)}{2 d} - \frac{3 e a^2 b^2 \operatorname{arccosh}(d x + c)^2}{2 d} + \frac{d e b^4 \operatorname{arccosh}(d x + c)^4 x^2}{2} + \frac{3 d e b^4 \operatorname{arccosh}(d x + c)^2 x^2}{2} - 3 e a^2 b^2 \operatorname{arccosh}(d x + c) \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, x - 3 e a b^3 \operatorname{arccosh}(d x + c)^2 \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, x - \frac{\sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, a^3 b c e}{d} - \frac{e b^4 \operatorname{arccosh}(d x + c)^3 \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, c}{d} - \frac{3 e b^4 \operatorname{arccosh}(d x + c) \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, c}{2 d} - \frac{3 e a b^3 \sqrt{d x + c - 1}\, \sqrt{d x + c + 1}\, c}{2 d} + \frac{3 e a^2 b^2 c^2}{2 d} + \frac{3 d e a^2 b^2 x^2}{2} + e b^4 \operatorname{arccosh}(d x + c)^4 x c + 3 e a^2 b^2 x c$$

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

$$\int \frac{(a + b \operatorname{arccosh}(d x + c))^4}{d e x + c e}\, dx$$

Optimal(type 4, 258 leaves, 10 steps):

$$\frac{(a+b\,\mathrm{arccosh}(d x+c))^5}{5 b d e}+\frac{(a+b\,\mathrm{arccosh}(d x+c))^4 \ln\left(1+\frac{1}{\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2}\right)}{d e}$$

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

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

$$-\frac{3 b^3\,(a+b\,\mathrm{arccosh}(d x+c))\,\mathrm{polylog}\left(4,-\frac{1}{\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2}\right)}{d e}$$

$$-\frac{3 b^4\,\mathrm{polylog}\left(5,-\frac{1}{\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2}\right)}{2 d e}$$

Result(type 4, 726 leaves):

$$\frac{a^4 \ln(d x+c)}{d e}-\frac{b^4 \mathrm{arccosh}(d x+c)^5}{5 d e}+\frac{b^4 \mathrm{arccosh}(d x+c)^4 \ln\left(1+\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}$$

$$+\frac{2 b^4 \mathrm{arccosh}(d x+c)^3 \mathrm{polylog}\left(2,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}$$

$$-\frac{3 b^4 \mathrm{arccosh}(d x+c)^2 \mathrm{polylog}\left(3,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}$$

$$+\frac{3 b^4 \mathrm{arccosh}(d x+c)\,\mathrm{polylog}\left(4,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}-\frac{3 b^4 \mathrm{polylog}\left(5,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{2 d e}$$

$$-\frac{a b^3 \mathrm{arccosh}(d x+c)^4}{d e}+\frac{4 a b^3 \mathrm{arccosh}(d x+c)^3 \ln\left(1+\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}$$

$$+\frac{6 a b^3 \mathrm{arccosh}(d x+c)^2 \mathrm{polylog}\left(2,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}$$

$$-\frac{6 a b^3 \mathrm{arccosh}(d x+c)\,\mathrm{polylog}\left(3,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}+\frac{3 a b^3 \mathrm{polylog}\left(4,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}$$

$$-\frac{2 a^2 b^2 \mathrm{arccosh}(d x+c)^3}{d e}+\frac{6 a^2 b^2 \mathrm{arccosh}(d x+c)^2 \ln\left(1+\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}$$

$$+\frac{6 a^2 b^2 \mathrm{arccosh}(d x+c)\,\mathrm{polylog}\left(2,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}-\frac{3 a^2 b^2 \mathrm{polylog}\left(3,-\left(d x+c+\sqrt{d x+c-1}\,\sqrt{d x+c+1}\right)^2\right)}{d e}$$

$$-\frac{2 a^3 b \operatorname{arccosh}(d x+c)^2}{d e}+\frac{4 a^3 b \operatorname{arccosh}(d x+c) \ln\left(1+\left(d x+c+\sqrt{d x+c-1}\, \sqrt{d x+c+1}\right)^2\right)}{d e}$$
$$+\frac{2 a^3 b \operatorname{polylog}\left(2, -\left(d x+c+\sqrt{d x+c-1}\, \sqrt{d x+c+1}\right)^2\right)}{d e}$$

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Problem 41: Result more than twice size of optimal antiderivative.
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$$\int \frac{(d e x+c e)^4}{(a+b \operatorname{arccosh}(d x+c))^3}\, dx$$

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Optimal(type 4, 307 leaves, 26 steps):
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$$\frac{2 e^4 (d x+c)^3}{b^2 d (a+b \operatorname{arccosh}(d x+c))}-\frac{5 e^4 (d x+c)^5}{2 b^2 d (a+b \operatorname{arccosh}(d x+c))}+\frac{e^4 \cosh\left(\frac{a}{b}\right) \operatorname{Shi}\left(\frac{a+b \operatorname{arccosh}(d x+c)}{b}\right)}{16 b^3 d}$$
$$+\frac{27 e^4 \cosh\left(\frac{3 a}{b}\right) \operatorname{Shi}\left(\frac{3 (a+b \operatorname{arccosh}(d x+c))}{b}\right)}{32 b^3 d}+\frac{25 e^4 \cosh\left(\frac{5 a}{b}\right) \operatorname{Shi}\left(\frac{5 (a+b \operatorname{arccosh}(d x+c))}{b}\right)}{32 b^3 d}$$
$$-\frac{e^4 \operatorname{Chi}\left(\frac{a+b \operatorname{arccosh}(d x+c)}{b}\right) \sinh\left(\frac{a}{b}\right)}{16 b^3 d}-\frac{27 e^4 \operatorname{Chi}\left(\frac{3 (a+b \operatorname{arccosh}(d x+c))}{b}\right) \sinh\left(\frac{3 a}{b}\right)}{32 b^3 d}$$
$$-\frac{25 e^4 \operatorname{Chi}\left(\frac{5 (a+b \operatorname{arccosh}(d x+c))}{b}\right) \sinh\left(\frac{5 a}{b}\right)}{32 b^3 d}-\frac{e^4 (d x+c)^4 \sqrt{d x+c-1}\, \sqrt{d x+c+1}}{2 b d (a+b \operatorname{arccosh}(d x+c))^2}$$

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Result(type 4, 992 leaves):
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$$\frac{1}{d}\Bigg(-\frac{1}{64 b^2 \left(b^2 \operatorname{arccosh}(d x+c)^2+2 a b \operatorname{arccosh}(d x+c)+a^2\right)}\Big(\Big(-16 (d x+c)^4 \sqrt{d x+c-1}\, \sqrt{d x+c+1}+12 (d x+c)^2 \sqrt{d x+c-1}\, \sqrt{d x+c+1}$$
$$-\sqrt{d x+c-1}\, \sqrt{d x+c+1}+16 (d x+c)^5-20 (d x+c)^3+5 d x+5 c\Big) e^4 (5 b \operatorname{arccosh}(d x+c)+5 a-b)\Big)$$
$$+\frac{25 e^4 \mathrm{e}^{\frac{5 a}{b}} \operatorname{Ei}_1\left(5 \operatorname{arccosh}(d x+c)+\frac{5 a}{b}\right)}{64 b^3}$$
$$-\frac{3 \left(-4 (d x+c)^2 \sqrt{d x+c-1}\, \sqrt{d x+c+1}+\sqrt{d x+c-1}\, \sqrt{d x+c+1}+4 (d x+c)^3-3 d x-3 c\right) e^4 (3 b \operatorname{arccosh}(d x+c)+3 a-b)}{64 b^2 \left(b^2 \operatorname{arccosh}(d x+c)^2+2 a b \operatorname{arccosh}(d x+c)+a^2\right)}$$

$$+\frac{27 e^4 e^{\frac{3a}{b}} \operatorname{Ei}_1\left(3\operatorname{arccosh}(dx+c)+\frac{3a}{b}\right)}{64 b^3}-\frac{\left(-\sqrt{dx+c-1}\,\sqrt{dx+c+1}+dx+c\right) e^4 \left(b\operatorname{arccosh}(dx+c)+a-b\right)}{32 b^2 \left(b^2\operatorname{arccosh}(dx+c)^2+2ab\operatorname{arccosh}(dx+c)+a^2\right)}$$

$$+\frac{e^4 e^{\frac{a}{b}} \operatorname{Ei}_1\left(\operatorname{arccosh}(dx+c)+\frac{a}{b}\right)}{32 b^3}-\frac{e^4\left(dx+c+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)}{32 b\left(a+b\operatorname{arccosh}(dx+c)\right)^2}-\frac{e^4\left(dx+c+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)}{32 b^2\left(a+b\operatorname{arccosh}(dx+c)\right)}$$

$$-\frac{e^4 e^{-\frac{a}{b}} \operatorname{Ei}_1\left(-\operatorname{arccosh}(dx+c)-\frac{a}{b}\right)}{32 b^3}-\frac{3 e^4\left(4(dx+c)^3-3dx-3c+4(dx+c)^2\sqrt{dx+c-1}\,\sqrt{dx+c+1}-\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)}{64 b\left(a+b\operatorname{arccosh}(dx+c)\right)^2}$$

$$-\frac{9 e^4\left(4(dx+c)^3-3dx-3c+4(dx+c)^2\sqrt{dx+c-1}\,\sqrt{dx+c+1}-\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)}{64 b^2\left(a+b\operatorname{arccosh}(dx+c)\right)}$$

$$-\frac{27 e^4 e^{-\frac{3a}{b}} \operatorname{Ei}_1\left(-3\operatorname{arccosh}(dx+c)-\frac{3a}{b}\right)}{64 b^3}-\frac{1}{64 b\left(a+b\operatorname{arccosh}(dx+c)\right)^2}\Big(e^4\Big(16(dx+c)^5-20(dx+c)^3+16(dx$$

$$+c)^4\sqrt{dx+c-1}\,\sqrt{dx+c+1}+5dx+5c-12(dx+c)^2\sqrt{dx+c-1}\,\sqrt{dx+c+1}+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\Big)\Big)$$

$$-\frac{1}{64 b^2\left(a+b\operatorname{arccosh}(dx+c)\right)}\Big(5 e^4\Big(16(dx+c)^5-20(dx+c)^3+16(dx+c)^4\sqrt{dx+c-1}\,\sqrt{dx+c+1}+5dx+5c-12(dx$$

$$+c)^2\sqrt{dx+c-1}\,\sqrt{dx+c+1}+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\Big)\Big)-\frac{25 e^4 e^{-\frac{5a}{b}} \operatorname{Ei}_1\left(-5\operatorname{arccosh}(dx+c)-\frac{5a}{b}\right)}{64 b^3}\Bigg)$$

Problem 43: Result more than twice size of optimal antiderivative.

$$\int \frac{(dex+ce)^4}{\left(a+b\operatorname{arccosh}(dx+c)\right)^4}\,dx$$

Optimal(type 4, 399 leaves, 24 steps):

$$\frac{2 e^4 (dx+c)^3}{3 b^2 d\left(a+b\operatorname{arccosh}(dx+c)\right)^2}-\frac{5 e^4 (dx+c)^5}{6 b^2 d\left(a+b\operatorname{arccosh}(dx+c)\right)^2}+\frac{e^4 \operatorname{Chi}\left(\frac{a+b\operatorname{arccosh}(dx+c)}{b}\right)\cosh\left(\frac{a}{b}\right)}{48 b^4 d}$$

$$+\frac{27 e^4 \operatorname{Chi}\left(\frac{3(a+b\operatorname{arccosh}(dx+c))}{b}\right)\cosh\left(\frac{3a}{b}\right)}{32 b^4 d}+\frac{125 e^4 \operatorname{Chi}\left(\frac{5(a+b\operatorname{arccosh}(dx+c))}{b}\right)\cosh\left(\frac{5a}{b}\right)}{96 b^4 d}$$

$$-\frac{e^4 \operatorname{Shi}\left(\frac{a+b\operatorname{arccosh}(dx+c)}{b}\right)\sinh\left(\frac{a}{b}\right)}{48 b^4 d}-\frac{27 e^4 \operatorname{Shi}\left(\frac{3(a+b\operatorname{arccosh}(dx+c))}{b}\right)\sinh\left(\frac{3a}{b}\right)}{32 b^4 d}$$

$$-\frac{125 e^4 \operatorname{Shi}\left(\frac{5(a+b\operatorname{arccosh}(dx+c))}{b}\right)\sinh\left(\frac{5a}{b}\right)}{96 b^4 d}-\frac{e^4 (dx+c)^4\sqrt{dx+c-1}\,\sqrt{dx+c+1}}{3 b d (a+b\operatorname{arccosh}(dx+c))^3}+\frac{2 e^4 (dx+c)^2\sqrt{dx+c-1}\,\sqrt{dx+c+1}}{b^3 d (a+b\operatorname{arccosh}(dx+c))}$$

$$-\frac{25 e^4 (dx+c)^4\sqrt{dx+c-1}\,\sqrt{dx+c+1}}{6 b^3 d (a+b\operatorname{arccosh}(dx+c))}$$

Result(type 4, 1374 leaves):

$$\frac{1}{d}\Bigg(\Big(\Big(-16 (dx+c)^4\sqrt{dx+c-1}\,\sqrt{dx+c+1}+12 (dx+c)^2\sqrt{dx+c-1}\,\sqrt{dx+c+1}-\sqrt{dx+c-1}\,\sqrt{dx+c+1}+16 (dx+c)^5-20 (dx+c)^3$$

$$+5dx+5c\Big) e^4 \left(25 b^2\operatorname{arccosh}(dx+c)^2+50 a b\operatorname{arccosh}(dx+c)-5\operatorname{arccosh}(dx+c) b^2+25 a^2-5ab+2b^2\right)\Big)\Big/\Big(192 b^3 \big(b^3\operatorname{arccosh}(dx+c)^3$$

$$+3 a b^2\operatorname{arccosh}(dx+c)^2+3 b a^2\operatorname{arccosh}(dx+c)+a^3\big)\Big)-\frac{125 e^4 \mathrm{e}^{\frac{5a}{b}}\operatorname{Ei}_1\left(5\operatorname{arccosh}(dx+c)+\frac{5a}{b}\right)}{192 b^4}+\Big(\Big(-4\ (dx+c)^2\sqrt{dx+c-1}\,\sqrt{dx+c+1}+\sqrt{dx}$$

$$+a^3)\Big)-\frac{27 e^4 \mathrm{e}^{\frac{3a}{b}}\operatorname{Ei}_1\left(3\operatorname{arccosh}(dx+c)+\frac{3a}{b}\right)}{64 b^4}$$

$$+\frac{\left(-\sqrt{dx+c-1}\,\sqrt{dx+c+1}+dx+c\right) e^4\left(b^2\operatorname{arccosh}(dx+c)^2+2ab\operatorname{arccosh}(dx+c)-\operatorname{arccosh}(dx+c) b^2+a^2-ab+2b^2\right)}{96 b^3\left(b^3\operatorname{arccosh}(dx+c)^3+3ab^2\operatorname{arccosh}(dx+c)^2+3ba^2\operatorname{arccosh}(dx+c)+a^3\right)}$$

$$-\frac{e^4 \mathrm{e}^{\frac{a}{b}}\operatorname{Ei}_1\left(\operatorname{arccosh}(dx+c)+\frac{a}{b}\right)}{96 b^4}-\frac{e^4\left(dx+c+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)}{48 b (a+b\operatorname{arccosh}(dx+c))^3}-\frac{e^4\left(dx+c+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)}{96 b^2 (a+b\operatorname{arccosh}(dx+c))^2}$$

$$-\frac{e^4\left(dx+c+\sqrt{dx+c-1}\,\sqrt{dx+c+1}\right)}{96 b^3 (a+b\operatorname{arccosh}(dx+c))}-\frac{e^4 \mathrm{e}^{-\frac{a}{b}}\operatorname{Ei}_1\left(-\operatorname{arccosh}(dx+c)-\frac{a}{b}\right)}{96 b^4}$$

$$-\frac{e^4\left(4(dx+c)^3-3dx-3c+4(dx+c)^2\sqrt{dx+c-1}\sqrt{dx+c+1}-\sqrt{dx+c-1}\sqrt{dx+c+1}\right)}{32b(a+b\operatorname{arccosh}(dx+c))^3}$$

$$-\frac{3e^4\left(4(dx+c)^3-3dx-3c+4(dx+c)^2\sqrt{dx+c-1}\sqrt{dx+c+1}-\sqrt{dx+c-1}\sqrt{dx+c+1}\right)}{64b^2(a+b\operatorname{arccosh}(dx+c))^2}$$

$$-\frac{9e^4\left(4(dx+c)^3-3dx-3c+4(dx+c)^2\sqrt{dx+c-1}\sqrt{dx+c+1}-\sqrt{dx+c-1}\sqrt{dx+c+1}\right)}{64b^3(a+b\operatorname{arccosh}(dx+c))}$$

$$-\frac{27e^4\mathrm{e}^{-\frac{3a}{b}}\operatorname{Ei}_1\left(-3\operatorname{arccosh}(dx+c)-\frac{3a}{b}\right)}{64b^4}-\frac{1}{96b(a+b\operatorname{arccosh}(dx+c))^3}\left(e^4\left(16(dx+c)^5-20(dx+c)^3+16(dx\right.\right.$$

$$\left.\left.+c)^4\sqrt{dx+c-1}\sqrt{dx+c+1}+5dx+5c-12(dx+c)^2\sqrt{dx+c-1}\sqrt{dx+c+1}+\sqrt{dx+c-1}\sqrt{dx+c+1}\right)\right)$$

$$-\frac{1}{192b^2(a+b\operatorname{arccosh}(dx+c))^2}\left(5e^4\left(16(dx+c)^5-20(dx+c)^3+16(dx+c)^4\sqrt{dx+c-1}\sqrt{dx+c+1}+5dx+5c-12(dx\right.\right.$$

$$\left.\left.+c)^2\sqrt{dx+c-1}\sqrt{dx+c+1}+\sqrt{dx+c-1}\sqrt{dx+c+1}\right)\right)-\frac{1}{192b^3(a+b\operatorname{arccosh}(dx+c))}\left(25e^4\left(16(dx+c)^5-20(dx+c)^3\right.\right.$$

$$\left.\left.+16(dx+c)^4\sqrt{dx+c-1}\sqrt{dx+c+1}+5dx+5c-12(dx+c)^2\sqrt{dx+c-1}\sqrt{dx+c+1}+\sqrt{dx+c-1}\sqrt{dx+c+1}\right)\right)$$

$$\left.-\frac{125e^4\mathrm{e}^{-\frac{5a}{b}}\operatorname{Ei}_1\left(-5\operatorname{arccosh}(dx+c)-\frac{5a}{b}\right)}{192b^4}\right)$$

Problem 45: Unable to integrate problem.

$$\int(dex+ce)^3\sqrt{a+b\operatorname{arccosh}(dx+c)}\,\mathrm{d}x$$

Optimal(type 4, 218 leaves, 16 steps):

$$-\frac{e^3 \mathrm{e}^{\frac{2a}{b}} \operatorname{erf}\left(\frac{\sqrt{2}\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{b}\sqrt{2}\sqrt{\pi}}{64d} - \frac{e^3 \operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{b}\sqrt{2}\sqrt{\pi}}{64d\,\mathrm{e}^{\frac{2a}{b}}}$$

$$-\frac{e^3 \mathrm{e}^{\frac{4a}{b}} \operatorname{erf}\left(\frac{2\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{b}\sqrt{\pi}}{256d} - \frac{e^3 \operatorname{erfi}\left(\frac{2\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{b}\sqrt{\pi}}{256d\,\mathrm{e}^{\frac{4a}{b}}} - \frac{3e^3\sqrt{a+b\operatorname{arccosh}(dx+c)}}{32d}$$

$$+\frac{e^3(dx+c)^4\sqrt{a+b\operatorname{arccosh}(dx+c)}}{4d}$$

Result(type 8, 25 leaves):

$$\int (dex+ce)^3\sqrt{a+b\operatorname{arccosh}(dx+c)}\,\mathrm{d}x$$

Problem 46: Unable to integrate problem.

$$\int (dex+ce)^2\sqrt{a+b\operatorname{arccosh}(dx+c)}\,\mathrm{d}x$$

Optimal(type 4, 194 leaves, 16 steps):

$$-\frac{e^2 \mathrm{e}^{\frac{3a}{b}} \operatorname{erf}\left(\frac{\sqrt{3}\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{b}\sqrt{3}\sqrt{\pi}}{144d} - \frac{e^2 \operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{b}\sqrt{3}\sqrt{\pi}}{144d\,\mathrm{e}^{\frac{3a}{b}}}$$

$$-\frac{e^2 \mathrm{e}^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{b}\sqrt{\pi}}{16d} - \frac{e^2 \operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arccosh}(dx+c)}}{\sqrt{b}}\right)\sqrt{b}\sqrt{\pi}}{16d\,\mathrm{e}^{\frac{a}{b}}} + \frac{e^2(dx+c)^3\sqrt{a+b\operatorname{arccosh}(dx+c)}}{3d}$$

Result(type 8, 25 leaves):

$$\int (dex+ce)^2\sqrt{a+b\operatorname{arccosh}(dx+c)}\,\mathrm{d}x$$

Problem 47: Unable to integrate problem.

$$\int (dex+ce)^3(a+b\operatorname{arccosh}(dx+c))^{5/2}\,\mathrm{d}x$$

Optimal(type 4, 387 leaves, 29 steps):

$$-\frac{3 e^3 (a+b \operatorname{arccosh}(d x+c))^{5/2}}{32 d}+\frac{e^3 (d x+c)^4 (a+b \operatorname{arccosh}(d x+c))^{5/2}}{4 d}-\frac{15 b^{5/2} e^3 e^{\frac{2 a}{b}} \operatorname{erf}\left(\frac{\sqrt{2} \sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{2} \sqrt{\pi}}{1024 d}$$

$$-\frac{15 b^{5/2} e^3 \operatorname{erfi}\left(\frac{\sqrt{2} \sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{2} \sqrt{\pi}}{1024 d e^{\frac{2 a}{b}}}-\frac{15 b^{5/2} e^3 e^{\frac{4 a}{b}} \operatorname{erf}\left(\frac{2 \sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{\pi}}{16384 d}$$

$$-\frac{15 b^{5/2} e^3 \operatorname{erfi}\left(\frac{2 \sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{\pi}}{16384 d e^{\frac{4 a}{b}}}-\frac{15 b e^3 (d x+c) (a+b \operatorname{arccosh}(d x+c))^{3/2} \sqrt{d x+c-1} \sqrt{d x+c+1}}{64 d}$$

$$-\frac{5 b e^3 (d x+c)^3 (a+b \operatorname{arccosh}(d x+c))^{3/2} \sqrt{d x+c-1} \sqrt{d x+c+1}}{32 d}-\frac{225 b^2 e^3 \sqrt{a+b \operatorname{arccosh}(d x+c)}}{2048 d}$$

$$+\frac{45 b^2 e^3 (d x+c)^2 \sqrt{a+b \operatorname{arccosh}(d x+c)}}{256 d}+\frac{15 b^2 e^3 (d x+c)^4 \sqrt{a+b \operatorname{arccosh}(d x+c)}}{256 d}$$

Result(type 8, 25 leaves):

$$\int (d e x+c e)^3 (a+b \operatorname{arccosh}(d x+c))^{5/2} \, dx$$

Problem 48: Unable to integrate problem.

$$\int (d e x+c e) (a+b \operatorname{arccosh}(d x+c))^{5/2} \, dx$$

Optimal(type 4, 219 leaves, 14 steps):

$$-\frac{e (a+b \operatorname{arccosh}(d x+c))^{5/2}}{4 d}+\frac{e (d x+c)^2 (a+b \operatorname{arccosh}(d x+c))^{5/2}}{2 d}-\frac{15 b^{5/2} e e^{\frac{2 a}{b}} \operatorname{erf}\left(\frac{\sqrt{2} \sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{2} \sqrt{\pi}}{512 d}$$

$$-\frac{15 b^{5/2} e \operatorname{erfi}\left(\frac{\sqrt{2} \sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{2} \sqrt{\pi}}{512 d e^{\frac{2 a}{b}}}-\frac{5 b e (d x+c) (a+b \operatorname{arccosh}(d x+c))^{3/2} \sqrt{d x+c-1} \sqrt{d x+c+1}}{8 d}$$

$$-\frac{15 b^2 e \sqrt{a+b \operatorname{arccosh}(d x+c)}}{64 d}+\frac{15 b^2 e (d x+c)^2 \sqrt{a+b \operatorname{arccosh}(d x+c)}}{32 d}$$

Result(type 8, 23 leaves):

$$\int (d e x+c e) (a+b \operatorname{arccosh}(d x+c))^{5/2} \, dx$$

Problem 49: Unable to integrate problem.

$$\int \frac{(d e x+c e)^2}{(a+b \operatorname{arccosh}(d x+c))^{5/2}} \, dx$$

Optimal(type 4, 271 leaves, 24 steps):

$$-\frac{e^2 e^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{\pi}}{6 b^{5/2} d}+\frac{e^2 \operatorname{erfi}\left(\frac{\sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{\pi}}{6 b^{5/2} d e^{\frac{a}{b}}}-\frac{e^2 e^{\frac{3 a}{b}} \operatorname{erf}\left(\frac{\sqrt{3} \sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{3} \sqrt{\pi}}{2 b^{5/2} d}$$
$$+\frac{e^2 \operatorname{erfi}\left(\frac{\sqrt{3} \sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{3} \sqrt{\pi}}{2 b^{5/2} d e^{\frac{3 a}{b}}}-\frac{2 e^2 (d x+c)^2 \sqrt{d x+c-1} \sqrt{d x+c+1}}{3 b d (a+b \operatorname{arccosh}(d x+c))^{3/2}}+\frac{8 e^2 (d x+c)}{3 b^2 d \sqrt{a+b \operatorname{arccosh}(d x+c)}}$$
$$-\frac{4 e^2 (d x+c)^3}{b^2 d \sqrt{a+b \operatorname{arccosh}(d x+c)}}$$

Result(type 8, 25 leaves):

$$\int \frac{(d e x+c e)^2}{(a+b \operatorname{arccosh}(d x+c))^{5/2}} \, dx$$

Problem 50: Unable to integrate problem.

$$\int \frac{1}{(a+b \operatorname{arccosh}(d x+c))^{5/2}} \, dx$$

Optimal(type 4, 132 leaves, 9 steps):

$$-\frac{2 e^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{\pi}}{3 b^{5/2} d}+\frac{2 \operatorname{erfi}\left(\frac{\sqrt{a+b \operatorname{arccosh}(d x+c)}}{\sqrt{b}}\right) \sqrt{\pi}}{3 b^{5/2} d e^{\frac{a}{b}}}-\frac{2 \sqrt{d x+c-1} \sqrt{d x+c+1}}{3 b d (a+b \operatorname{arccosh}(d x+c))^{3/2}}$$
$$-\frac{4 (d x+c)}{3 b^2 d \sqrt{a+b \operatorname{arccosh}(d x+c)}}$$

Result(type 8, 14 leaves):

$$\int \frac{1}{(a+b \operatorname{arccosh}(d x+c))^{5/2}} \, dx$$

Problem 52: Result more than twice size of optimal antiderivative.

$$\int (d e x+c e)^{3/2} (a+b \operatorname{arccosh}(d x+c)) \, dx$$

Optimal(type 4, 121 leaves, 6 steps):

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

Result(type 4, 253 leaves):

$$\frac{1}{d e}\left(2\left(\frac{(d e x+c e)^{5/2}a}{5}+b\left(\frac{(d e x+c e)^{5/2}\,\mathrm{arccosh}\left(\frac{d e x+c e}{e}\right)}{5}-\frac{1}{25\,e\sqrt{-\frac{1}{e}}\,\sqrt{\frac{d e x+c e+e}{e}}\,\sqrt{\frac{d e x+c e-e}{e}}}\left(2\left(\sqrt{-\frac{1}{e}}\,(d e x+c e)^{7/2}\right.\right.\right.\right.\right.$$
$$+3\sqrt{\frac{d e x+c e+e}{e}}\,\sqrt{-\frac{d e x+c e-e}{e}}\,e^{3}\,\mathrm{EllipticF}\left(\sqrt{d e x+c e}\,\sqrt{-\frac{1}{e}},\mathrm{I}\right)$$
$$\left.\left.\left.\left.\left.-3\,e^{3}\sqrt{\frac{d e x+c e+e}{e}}\,\sqrt{-\frac{d e x+c e-e}{e}}\,\mathrm{EllipticE}\left(\sqrt{d e x+c e}\,\sqrt{-\frac{1}{e}},\mathrm{I}\right)-\sqrt{-\frac{1}{e}}\,(d e x+c e)^{3/2}e^{2}\right)\right)\right)\right)\right)$$

Problem 54: Unable to integrate problem.

$$\int (d e x+c e)^{5/2}\,(a+b\,\mathrm{arccosh}(d x+c))^{2}\,dx$$

Optimal(type 5, 125 leaves, 3 steps):

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

Result(type 8, 25 leaves):

$$\int (d e x+c e)^{5/2}\,(a+b\,\mathrm{arccosh}(d x+c))^{2}\,dx$$

Problem 55: Unable to integrate problem.

$$\int (d e x+c e)^{3/2}\,(a+b\,\mathrm{arccosh}(d x+c))^{2}\,dx$$

Optimal(type 5, 125 leaves, 3 steps):

$$\frac{2\,(e\,(d x+c))^{5/2}\,(a+b\,\mathrm{arccosh}(d x+c))^{2}}{5\,d\,e}-\frac{16\,b^{2}\,(e\,(d x+c))^{9/2}\,\mathit{HypergeometricPFQ}\left(\left[1,\frac{9}{4},\frac{9}{4}\right],\left[\frac{11}{4},\frac{13}{4}\right],(d x+c)^{2}\right)}{315\,d\,e^{3}}$$

$$-\frac{8 b (e (d x+c))^{7/2} (a+b \operatorname{arccosh}(d x+c)) \operatorname{hypergeom}\left(\left[\frac{1}{2}, \frac{7}{4}\right],\left[\frac{11}{4}\right],(d x+c)^2\right) \sqrt{-d x-c+1}}{35 d e^2 \sqrt{d x+c-1}}$$

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Result(type 8, 25 leaves):
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$$\int (d e x+c e)^{3/2} (a+b \operatorname{arccosh}(d x+c))^2 \, dx$$

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Problem 60: Unable to integrate problem.
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$$\int (d e x+c e)^m (a+b \operatorname{arccosh}(d x+c))^2 \, dx$$

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Optimal(type 5, 184 leaves, 3 steps):
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$$\frac{(e (d x+c))^{1+m} (a+b \operatorname{arccosh}(d x+c))^2}{d e (1+m)}-\frac{2 b^2 (e (d x+c))^{3+m} \mathit{HypergeometricPFQ}\left(\left[1, \frac{3}{2}+\frac{m}{2}, \frac{3}{2}+\frac{m}{2}\right],\left[2+\frac{m}{2}, \frac{5}{2}+\frac{m}{2}\right],(d x+c)^2\right)}{d e^3 (1+m) (2+m) (3+m)}$$
$$-\frac{2 b (e (d x+c))^{2+m} (a+b \operatorname{arccosh}(d x+c)) \operatorname{hypergeom}\left(\left[\frac{1}{2}, 1+\frac{m}{2}\right],\left[2+\frac{m}{2}\right],(d x+c)^2\right) \sqrt{-d x-c+1}}{d e^2 (1+m) (2+m) \sqrt{d x+c-1}}$$

```
Result(type 8, 25 leaves):
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$$\int (d e x+c e)^m (a+b \operatorname{arccosh}(d x+c))^2 \, dx$$

```
Problem 62: Unable to integrate problem.
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$$\int \frac{\operatorname{arccosh}(a x^5)}{x} \, dx$$

```
Optimal(type 4, 82 leaves, 5 steps):
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$$-\frac{\operatorname{arccosh}(a x^5)^2}{10}+\frac{\operatorname{arccosh}(a x^5) \ln\left(1+\left(a x^5+\sqrt{a x^5-1} \sqrt{a x^5+1}\right)^2\right)}{5}+\frac{\operatorname{polylog}\left(2,-\left(a x^5+\sqrt{a x^5-1} \sqrt{a x^5+1}\right)^2\right)}{10}$$

```
Result(type 8, 12 leaves):
```

$$\int \frac{\operatorname{arccosh}(a x^5)}{x} \, dx$$

```
Problem 66: Unable to integrate problem.
```

$$\int \left(a+b \operatorname{arccosh}(x^2 d+1)\right)^2 dx$$

```
Optimal(type 3, 68 leaves, 2 steps):
```

$$8 b^2 x+x \left(a+b \operatorname{arccosh}(x^2 d+1)\right)^2-\frac{4 b \left(d x^4+2 x^2\right) \left(a+b \operatorname{arccosh}(x^2 d+1)\right)}{x \sqrt{x^2 d} \sqrt{x^2 d+2}}$$

Result(type 8, 16 leaves):

$$\int \left(a+b \,\mathrm{arccosh}\left(x^{2} d+1\right)\right)^{2}d x$$

Problem 68: Unable to integrate problem.

$$\int \left(a+b \,\mathrm{arccosh}\left(x^{2} d-1\right)\right)^{4}d x$$

Optimal(type 3, 139 leaves, 3 steps):

$$384 b^{4} x+48 b^{2} x \left(a+b \,\mathrm{arccosh}\left(x^{2} d-1\right)\right)^{2}+x \left(a+b \,\mathrm{arccosh}\left(x^{2} d-1\right)\right)^{4}+\frac{192 b^{3} \left(-d \,x^{4}+2 x^{2}\right) \left(a+b \,\mathrm{arccosh}\left(x^{2} d-1\right)\right)}{x \sqrt{x^{2} d}\, \sqrt{x^{2} d-2}}$$
$$+\frac{8 b \left(-d \,x^{4}+2 x^{2}\right) \left(a+b \,\mathrm{arccosh}\left(x^{2} d-1\right)\right)^{3}}{x \sqrt{x^{2} d}\, \sqrt{x^{2} d-2}}$$

Result(type 8, 16 leaves):

$$\int \left(a+b \,\mathrm{arccosh}\left(x^{2} d-1\right)\right)^{4}d x$$

Problem 70: Unable to integrate problem.

$$\int \frac{1}{\left(a+b \,\mathrm{arccosh}\left(x^{2} d+1\right)\right)^{3/2}}d x$$

Optimal(type 4, 176 leaves, 1 step):

$$\frac{\mathrm{erfi}\left(\frac{\sqrt{a+b \,\mathrm{arccosh}\left(x^{2} d+1\right)}\, \sqrt{2}}{2 \sqrt{b}}\right) \left(\cosh\left(\frac{a}{2 b}\right)-\sinh\left(\frac{a}{2 b}\right)\right) \sinh\left(\frac{\mathrm{arccosh}\left(x^{2} d+1\right)}{2}\right) \sqrt{2}\, \sqrt{\pi}}{2 b^{3/2} d x}$$
$$-\frac{\mathrm{erf}\left(\frac{\sqrt{a+b \,\mathrm{arccosh}\left(x^{2} d+1\right)}\, \sqrt{2}}{2 \sqrt{b}}\right) \left(\cosh\left(\frac{a}{2 b}\right)+\sinh\left(\frac{a}{2 b}\right)\right) \sinh\left(\frac{\mathrm{arccosh}\left(x^{2} d+1\right)}{2}\right) \sqrt{2}\, \sqrt{\pi}}{2 b^{3/2} d x}-\frac{\sqrt{x^{2} d}\, \sqrt{x^{2} d+2}}{b d x \sqrt{a+b \,\mathrm{arccosh}\left(x^{2} d+1\right)}}$$

Result(type 8, 16 leaves):

$$\int \frac{1}{\left(a+b \,\mathrm{arccosh}\left(x^{2} d+1\right)\right)^{3/2}}d x$$

Problem 71: Unable to integrate problem.

$$\int \frac{1}{\left(a+b \,\mathrm{arccosh}\left(x^{2} d+1\right)\right)^{5/2}}d x$$

Optimal(type 4, 205 leaves, 2 steps):

$$\frac{\operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arccosh}(x^2 d+1)}\,\sqrt{2}}{2\sqrt{b}}\right)\left(\cosh\left(\frac{a}{2b}\right)-\sinh\left(\frac{a}{2b}\right)\right)\sinh\left(\frac{\operatorname{arccosh}(x^2 d+1)}{2}\right)\sqrt{2}\,\sqrt{\pi}}{6\,b^{5/2}\,d\,x}$$

$$+\frac{\operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arccosh}(x^2 d+1)}\,\sqrt{2}}{2\sqrt{b}}\right)\left(\cosh\left(\frac{a}{2b}\right)+\sinh\left(\frac{a}{2b}\right)\right)\sinh\left(\frac{\operatorname{arccosh}(x^2 d+1)}{2}\right)\sqrt{2}\,\sqrt{\pi}}{6\,b^{5/2}\,d\,x}$$

$$+\frac{-d\,x^4-2\,x^2}{3\,b\,x\,(a+b\operatorname{arccosh}(x^2 d+1))^{3/2}\sqrt{x^2 d}\,\sqrt{x^2 d+2}}-\frac{x}{3\,b^2\sqrt{a+b\operatorname{arccosh}(x^2 d+1)}}$$

Result(type 8, 16 leaves):

$$\int\frac{1}{(a+b\operatorname{arccosh}(x^2 d+1))^{5/2}}\,\mathrm{d}x$$

Problem 72: Unable to integrate problem.

$$\int\frac{1}{\sqrt{a+b\operatorname{arccosh}(x^2 d-1)}}\,\mathrm{d}x$$

Optimal(type 4, 135 leaves, 1 step):

$$\frac{\cosh\left(\frac{\operatorname{arccosh}(x^2 d-1)}{2}\right)\operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arccosh}(x^2 d-1)}\,\sqrt{2}}{2\sqrt{b}}\right)\left(\cosh\left(\frac{a}{2b}\right)-\sinh\left(\frac{a}{2b}\right)\right)\sqrt{2}\,\sqrt{\pi}}{2\,d\,x\sqrt{b}}$$

$$-\frac{\cosh\left(\frac{\operatorname{arccosh}(x^2 d-1)}{2}\right)\operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arccosh}(x^2 d-1)}\,\sqrt{2}}{2\sqrt{b}}\right)\left(\cosh\left(\frac{a}{2b}\right)+\sinh\left(\frac{a}{2b}\right)\right)\sqrt{2}\,\sqrt{\pi}}{2\,d\,x\sqrt{b}}$$

Result(type 8, 16 leaves):

$$\int\frac{1}{\sqrt{a+b\operatorname{arccosh}(x^2 d-1)}}\,\mathrm{d}x$$

Problem 73: Unable to integrate problem.

$$\int\frac{1}{(a+b\operatorname{arccosh}(x^2 d-1))^{7/2}}\,\mathrm{d}x$$

Optimal(type 4, 246 leaves, 2 steps):

$$- \frac{x}{15 b^2 (a + b \operatorname{arccosh}(x^2 d - 1))^{3/2}} + \frac{\cosh\left(\frac{\operatorname{arccosh}(x^2 d - 1)}{2}\right) \operatorname{erfi}\left(\frac{\sqrt{a + b \operatorname{arccosh}(x^2 d - 1)}\,\sqrt{2}}{2\sqrt{b}}\right) \left(\cosh\left(\frac{a}{2b}\right) - \sinh\left(\frac{a}{2b}\right)\right) \sqrt{2}\,\sqrt{\pi}}{30 b^{7/2} d x}$$

$$+ \frac{\cosh\left(\frac{\operatorname{arccosh}(x^2 d - 1)}{2}\right) \operatorname{erf}\left(\frac{\sqrt{a + b \operatorname{arccosh}(x^2 d - 1)}\,\sqrt{2}}{2\sqrt{b}}\right) \left(\cosh\left(\frac{a}{2b}\right) + \sinh\left(\frac{a}{2b}\right)\right) \sqrt{2}\,\sqrt{\pi}}{30 b^{7/2} d x}$$

$$+ \frac{-d x^4 + 2 x^2}{5 b x (a + b \operatorname{arccosh}(x^2 d - 1))^{5/2} \sqrt{x^2 d}\,\sqrt{x^2 d - 2}} - \frac{\sqrt{x^2 d}\,\sqrt{x^2 d - 2}}{15 b^3 d x \sqrt{a + b \operatorname{arccosh}(x^2 d - 1)}}$$

Result(type 8, 16 leaves):

$$\int \frac{1}{(a + b \operatorname{arccosh}(x^2 d - 1))^{7/2}}\, dx$$

Problem 74: Result more than twice size of optimal antiderivative.

$$\int \left(b x + a + \sqrt{b x + a - 1}\,\sqrt{b x + a + 1}\right) dx$$

Optimal(type 3, 41 leaves, 5 steps):

$$\frac{\left(b x + a + \sqrt{b x + a - 1}\,\sqrt{b x + a + 1}\right)^2}{4 b} - \frac{\operatorname{arccosh}(b x + a)}{2 b}$$

Result(type 3, 146 leaves):

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

$$- \frac{\sqrt{(b x + a + 1)(b x + a - 1)}\,\ln\left(\frac{\frac{b(1 + a)}{2} + \frac{(a - 1) b}{2} + b^2 x}{\sqrt{b^2}} + \sqrt{x^2 b^2 + (b(1 + a) + (a - 1) b) x + (1 + a)(a - 1)}\right)}{2\sqrt{b x + a + 1}\,\sqrt{b x + a - 1}\,\sqrt{b^2}}$$

Problem 75: Result more than twice size of optimal antiderivative.

$$\int \frac{b x + a + \sqrt{b x + a - 1}\,\sqrt{b x + a + 1}}{x^3}\, dx$$

Optimal(type 3, 114 leaves, 7 steps):

$$- \frac{a}{2 x^2} - \frac{b}{x} - \frac{b^2 \arctan\left(\frac{\sqrt{1 - a}\,\sqrt{b x + a + 1}}{\sqrt{1 + a}\,\sqrt{b x + a - 1}}\right)}{(-a^2 + 1)^{3/2}} - \frac{(b x + a + 1)^{3/2} \sqrt{b x + a - 1}}{2 (1 + a) x^2} + \frac{b \sqrt{b x + a - 1}\,\sqrt{b x + a + 1}}{2 (-a^2 + 1) x}$$

Result(type 3, 235 leaves):

$$\frac{1}{2\sqrt{x^2 b^2+2abx+a^2-1}\,(a^2-1)^2 x^2}\Bigg(\sqrt{bx+a-1}\,\sqrt{bx+a+1}\,\Bigg(\sqrt{a^2-1}\,\ln\left(\frac{2\left(abx+\sqrt{a^2-1}\,\sqrt{x^2b^2+2abx+a^2-1}+a^2-1\right)}{x}\right)x^2 b^2 - x a^3 b\sqrt{x^2b^2+2abx+a^2-1} - a^4\sqrt{x^2b^2+2abx+a^2-1} + \sqrt{x^2b^2+2abx+a^2-1}\,xab + 2\sqrt{x^2b^2+2abx+a^2-1}\,a^2 - \sqrt{x^2b^2+2abx+a^2-1}\Bigg)\Bigg) - \frac{b}{x} - \frac{a}{2x^2}$$

Problem 76: Result more than twice size of optimal antiderivative.

$$\int \frac{bx+a+\sqrt{bx+a-1}\,\sqrt{bx+a+1}}{x^4}\,dx$$

Optimal(type 3, 157 leaves, 8 steps):

$$-\frac{a}{3x^3} - \frac{b}{2x^2} + \frac{(bx+a-1)^{3/2}(bx+a+1)^{3/2}}{3(-a^2+1)x^3} - \frac{ab^3\arctan\left(\frac{\sqrt{1-a}\,\sqrt{bx+a+1}}{\sqrt{1+a}\,\sqrt{bx+a-1}}\right)}{(-a^2+1)^{5/2}} - \frac{ab(bx+a+1)^{3/2}\sqrt{bx+a-1}}{2(1-a)(1+a)^2x^2} + \frac{ab^2\sqrt{bx+a-1}\,\sqrt{bx+a+1}}{2(-a^2+1)^2x}$$

Result(type 3, 373 leaves):

$$-\frac{1}{6\sqrt{x^2b^2+2abx+a^2-1}\,(a^2-1)^3x^3}\Bigg(\sqrt{bx+a-1}\,\sqrt{bx+a+1}\,\Bigg(3\sqrt{a^2-1}\,\ln\left(\frac{2\left(abx+\sqrt{a^2-1}\,\sqrt{x^2b^2+2abx+a^2-1}+a^2-1\right)}{x}\right)x^3ab^3 - x^2a^4b^2\sqrt{x^2b^2+2abx+a^2-1} + xa^5b\sqrt{x^2b^2+2abx+a^2-1} - \sqrt{x^2b^2+2abx+a^2-1}\,x^2a^2b^2 + 2a^6\sqrt{x^2b^2+2abx+a^2-1} - 2xa^3b\sqrt{x^2b^2+2abx+a^2-1} + 2\sqrt{x^2b^2+2abx+a^2-1}\,x^2b^2 - 6a^4\sqrt{x^2b^2+2abx+a^2-1} + \sqrt{x^2b^2+2abx+a^2-1}\,xab + 6\sqrt{x^2b^2+2abx+a^2-1}\,a^2 - 2\sqrt{x^2b^2+2abx+a^2-1}\Bigg)\Bigg) - \frac{b}{2x^2} - \frac{a}{3x^3}$$

Problem 77: Unable to integrate problem.

$$\int e^{\operatorname{arccosh}(bx+a)^2}x^3\,dx$$

Optimal(type 4, 265 leaves, 37 steps):

$$-\frac{\operatorname{erfi}(-2+\operatorname{arccosh}(b x+a))\sqrt{\pi}}{32 b^4 e^4}-\frac{\operatorname{erfi}(-1+\operatorname{arccosh}(b x+a))\sqrt{\pi}}{16 b^4 E}-\frac{3 a^2 \operatorname{erfi}(-1+\operatorname{arccosh}(b x+a))\sqrt{\pi}}{8 b^4 E}+\frac{\operatorname{erfi}(1+\operatorname{arccosh}(b x+a))\sqrt{\pi}}{16 b^4 E}$$

$$+\frac{3 a^2 \operatorname{erfi}(1+\operatorname{arccosh}(b x+a))\sqrt{\pi}}{8 b^4 E}+\frac{\operatorname{erfi}(2+\operatorname{arccosh}(b x+a))\sqrt{\pi}}{32 b^4 e^4}+\frac{3 a \operatorname{erfi}\left(-\frac{3}{2}+\operatorname{arccosh}(b x+a)\right)\sqrt{\pi}}{16 b^4 e^{\frac{9}{4}}}$$

$$+\frac{3 a \operatorname{erfi}\left(-\frac{1}{2}+\operatorname{arccosh}(b x+a)\right)\sqrt{\pi}}{16 b^4 e^{\frac{1}{4}}}+\frac{a^3 \operatorname{erfi}\left(-\frac{1}{2}+\operatorname{arccosh}(b x+a)\right)\sqrt{\pi}}{4 b^4 e^{\frac{1}{4}}}-\frac{3 a \operatorname{erfi}\left(\frac{1}{2}+\operatorname{arccosh}(b x+a)\right)\sqrt{\pi}}{16 b^4 e^{\frac{1}{4}}}$$

$$-\frac{a^3 \operatorname{erfi}\left(\frac{1}{2}+\operatorname{arccosh}(b x+a)\right)\sqrt{\pi}}{4 b^4 e^{\frac{1}{4}}}-\frac{3 a \operatorname{erfi}\left(\frac{3}{2}+\operatorname{arccosh}(b x+a)\right)\sqrt{\pi}}{16 b^4 e^{\frac{9}{4}}}$$

Result(type 8, 15 leaves):

$$\int e^{\operatorname{arccosh}(b x+a)^2} x^3 \, dx$$

Problem 79: Unable to integrate problem.

$$\int \frac{\operatorname{arccosh}\left(\sqrt{b x^2+1}\right)^n}{\sqrt{b x^2+1}} \, dx$$

Optimal(type 3, 52 leaves, 2 steps):

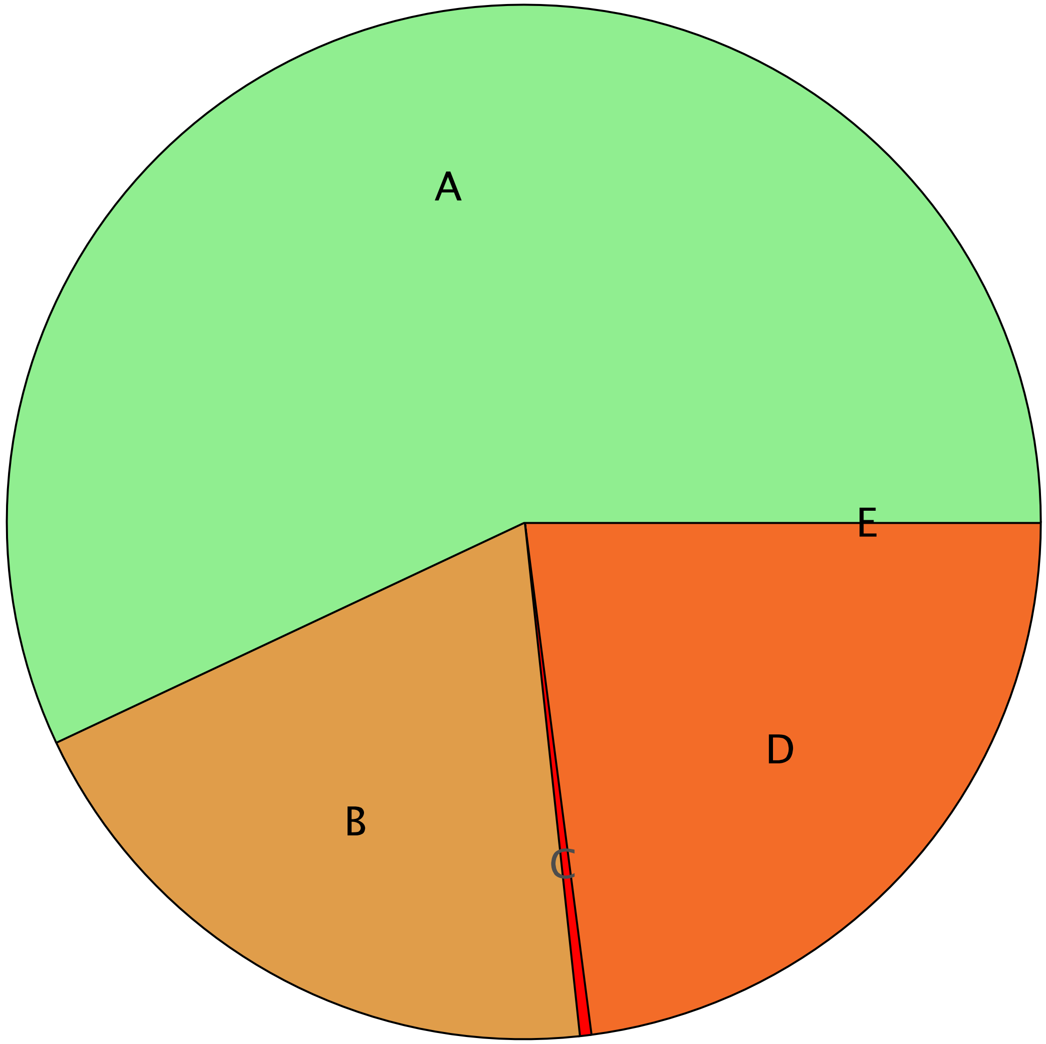
$$\frac{\operatorname{arccosh}\left(\sqrt{b x^2+1}\right)^{1+n} \sqrt{-1+\sqrt{b x^2+1}}\,\sqrt{1+\sqrt{b x^2+1}}}{b\,(1+n)\,x}$$

Result(type 8, 24 leaves):

$$\int \frac{\operatorname{arccosh}\left(\sqrt{b x^2+1}\right)^n}{\sqrt{b x^2+1}} \, dx$$

Summary of Integration Test Results

279 integration problems



A - 159 optimal antiderivatives
B - 55 more than twice size of optimal antiderivatives
C - 1 unnecessarily complex antiderivatives
D - 64 unable to integrate problems
E - 0 integration timeouts