Maple 2018.2 Integration Test Results
on the problems in "7 Inverse hyperbolic functions/7.1 Inverse hyperbolic sine"

Test results for the 46 problems in "7.1.2 (d x)^m (a+b arcsinh(c x))^n.txt"

Problem 24: Unable to integrate problem.

$$\int x^4 \operatorname{arcsinh}(a x)^{3/2}\, dx$$

Optimal(type 4, 202 leaves, 41 steps):

$$\frac{x^5 \operatorname{arcsinh}(a x)^{3/2}}{5} + \frac{3 \operatorname{erf}\left(\sqrt{5}\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{5}\sqrt{\pi}}{16000 a^5} + \frac{3 \operatorname{erfi}\left(\sqrt{5}\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{5}\sqrt{\pi}}{16000 a^5} - \frac{\operatorname{erf}\left(\sqrt{3}\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{3}\sqrt{\pi}}{384 a^5} - \frac{\operatorname{erfi}\left(\sqrt{3}\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{3}\sqrt{\pi}}{384 a^5} + \frac{3 \operatorname{erf}\left(\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{64 a^5} + \frac{3 \operatorname{erfi}\left(\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{64 a^5} - \frac{4\sqrt{a^2 x^2+1}\sqrt{\operatorname{arcsinh}(a x)}}{25 a^5} + \frac{2 x^2\sqrt{a^2 x^2+1}\sqrt{\operatorname{arcsinh}(a x)}}{25 a^3} - \frac{3 x^4\sqrt{a^2 x^2+1}\sqrt{\operatorname{arcsinh}(a x)}}{50 a}$$

Result(type 8, 12 leaves):

$$\int x^4 \operatorname{arcsinh}(a x)^{3/2}\, dx$$

Problem 25: Unable to integrate problem.

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

Optimal(type 4, 149 leaves, 25 steps):

$$-\frac{3 \operatorname{arcsinh}(a x)^{3/2}}{32 a^4} + \frac{x^4 \operatorname{arcsinh}(a x)^{3/2}}{4} + \frac{3 \operatorname{erf}\left(\sqrt{2}\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{2}\sqrt{\pi}}{256 a^4} - \frac{3 \operatorname{erfi}\left(\sqrt{2}\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{2}\sqrt{\pi}}{256 a^4} - \frac{3 \operatorname{erf}\left(2\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{2048 a^4} + \frac{3 \operatorname{erfi}\left(2\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{2048 a^4} + \frac{9 x\sqrt{a^2 x^2+1}\sqrt{\operatorname{arcsinh}(a x)}}{64 a^3} - \frac{3 x^3\sqrt{a^2 x^2+1}\sqrt{\operatorname{arcsinh}(a x)}}{32 a}$$

Result(type 8, 12 leaves):

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

Problem 27: Unable to integrate problem.

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

Optimal(type 4, 119 leaves, 18 steps):

$$\frac{\operatorname{erf}\left(\sqrt{5}\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{5}\,\sqrt{\pi}}{160\,a^5}+\frac{\operatorname{erfi}\left(\sqrt{5}\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{5}\,\sqrt{\pi}}{160\,a^5}+\frac{\operatorname{erf}\left(\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{16\,a^5}+\frac{\operatorname{erfi}\left(\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{16\,a^5}$$
$$-\frac{\operatorname{erf}\left(\sqrt{3}\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{3}\,\sqrt{\pi}}{32\,a^5}-\frac{\operatorname{erfi}\left(\sqrt{3}\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{3}\,\sqrt{\pi}}{32\,a^5}$$

Result(type 8, 12 leaves):

$$\int\frac{x^4}{\sqrt{\operatorname{arcsinh}(a x)}}\,\mathrm{d}x$$

Problem 28: Unable to integrate problem.

$$\int\frac{x^3}{\operatorname{arcsinh}(a x)^{3/2}}\,\mathrm{d}x$$

Optimal(type 4, 104 leaves, 12 steps):

$$-\frac{\operatorname{erf}\left(\sqrt{2}\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{2}\,\sqrt{\pi}}{4\,a^4}-\frac{\operatorname{erfi}\left(\sqrt{2}\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{2}\,\sqrt{\pi}}{4\,a^4}+\frac{\operatorname{erf}\left(2\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{4\,a^4}+\frac{\operatorname{erfi}\left(2\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{4\,a^4}-\frac{2\,x^3\,\sqrt{a^2\,x^2+1}}{a\,\sqrt{\operatorname{arcsinh}(a x)}}$$

Result(type 8, 12 leaves):

$$\int\frac{x^3}{\operatorname{arcsinh}(a x)^{3/2}}\,\mathrm{d}x$$

Problem 29: Unable to integrate problem.

$$\int\frac{x^2}{\operatorname{arcsinh}(a x)^{3/2}}\,\mathrm{d}x$$

Optimal(type 4, 100 leaves, 12 steps):

$$\frac{\operatorname{erf}\left(\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{4\,a^3}-\frac{\operatorname{erfi}\left(\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{\pi}}{4\,a^3}-\frac{\operatorname{erf}\left(\sqrt{3}\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{3}\,\sqrt{\pi}}{4\,a^3}+\frac{\operatorname{erfi}\left(\sqrt{3}\,\sqrt{\operatorname{arcsinh}(a x)}\right)\sqrt{3}\,\sqrt{\pi}}{4\,a^3}-\frac{2\,x^2\,\sqrt{a^2\,x^2+1}}{a\,\sqrt{\operatorname{arcsinh}(a x)}}$$

Result(type 8, 12 leaves):

$$\int\frac{x^2}{\operatorname{arcsinh}(a x)^{3/2}}\,\mathrm{d}x$$

Problem 31: Unable to integrate problem.

$$\int\frac{x^2}{\operatorname{arcsinh}(a x)^{7/2}}\,\mathrm{d}x$$

Optimal(type 4, 170 leaves, 22 steps):

$$-\frac{8 x}{15 a^{2} \operatorname{arcsinh}(a x)^{3/2}}-\frac{4 x^{3}}{5 \operatorname{arcsinh}(a x)^{3/2}}+\frac{\operatorname{erf}\left(\sqrt{\operatorname{arcsinh}(a x)}\right) \sqrt{\pi}}{15 a^{3}}-\frac{\operatorname{erfi}\left(\sqrt{\operatorname{arcsinh}(a x)}\right) \sqrt{\pi}}{15 a^{3}}-\frac{3 \operatorname{erf}\left(\sqrt{3} \sqrt{\operatorname{arcsinh}(a x)}\right) \sqrt{3} \sqrt{\pi}}{5 a^{3}}$$

$$+\frac{3 \operatorname{erfi}\left(\sqrt{3} \sqrt{\operatorname{arcsinh}(a x)}\right) \sqrt{3} \sqrt{\pi}}{5 a^{3}}-\frac{2 x^{2} \sqrt{a^{2} x^{2}+1}}{5 a \operatorname{arcsinh}(a x)^{5/2}}-\frac{16 \sqrt{a^{2} x^{2}+1}}{15 a^{3} \sqrt{\operatorname{arcsinh}(a x)}}-\frac{24 x^{2} \sqrt{a^{2} x^{2}+1}}{5 a \sqrt{\operatorname{arcsinh}(a x)}}$$

Result(type 8, 12 leaves):

$$\int \frac{x^{2}}{\operatorname{arcsinh}(a x)^{7/2}}\, dx$$

Problem 34: Unable to integrate problem.

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

Optimal(type 5, 119 leaves, 2 steps):

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

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

Result(type 8, 12 leaves):

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

Problem 35: Unable to integrate problem.

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

Optimal(type 5, 56 leaves, 2 steps):

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

Result(type 8, 10 leaves):

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

Problem 39: Unable to integrate problem.

$$\int x^{2} \operatorname{arcsinh}(a x)^{n}\, dx$$

Optimal(type 4, 105 leaves, 9 steps):

$$\frac{3^{-1-n}\operatorname{arcsinh}(a x)^n \Gamma(1+n, -3\operatorname{arcsinh}(a x))}{8 a^3 (-\operatorname{arcsinh}(a x))^n} - \frac{\operatorname{arcsinh}(a x)^n \Gamma(1+n, -\operatorname{arcsinh}(a x))}{8 a^3 (-\operatorname{arcsinh}(a x))^n} + \frac{\Gamma(1+n, \operatorname{arcsinh}(a x))}{8 a^3} - \frac{3^{-1-n}\Gamma(1+n, 3\operatorname{arcsinh}(a x))}{8 a^3}$$

Result(type 8, 12 leaves):

$$\int x^2 \operatorname{arcsinh}(a x)^n \, dx$$

Problem 40: Result unnecessarily involves higher level functions.

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

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

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

Result(type 5, 39 leaves):

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

Problem 41: Unable to integrate problem.

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

Optimal(type 4, 256 leaves, 24 steps):

$$\frac{x^3 (a+b\operatorname{arcsinh}(c x))^{5/2}}{3} + \frac{5 b^{5/2} e^{\frac{3a}{b}} \operatorname{erf}\left(\frac{\sqrt{3}\sqrt{a+b\operatorname{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{3}\sqrt{\pi}}{1728 c^3} - \frac{5 b^{5/2} \operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\operatorname{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{3}\sqrt{\pi}}{1728 c^3 e^{\frac{3a}{b}}}$$
$$- \frac{15 b^{5/2} e^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{\pi}}{64 c^3} + \frac{15 b^{5/2} \operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{\pi}}{64 c^3 e^{\frac{a}{b}}} + \frac{5 b (a+b\operatorname{arcsinh}(c x))^{3/2}\sqrt{c^2 x^2+1}}{9 c^3}$$
$$- \frac{5 b x^2 (a+b\operatorname{arcsinh}(c x))^{3/2}\sqrt{c^2 x^2+1}}{18 c} - \frac{5 b^2 x \sqrt{a+b\operatorname{arcsinh}(c x)}}{6 c^2} + \frac{5 b^2 x^3 \sqrt{a+b\operatorname{arcsinh}(c x)}}{36}$$

Result(type 8, 16 leaves):

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

Problem 42: Unable to integrate problem.

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

Optimal(type 4, 67 leaves, 6 steps):

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

Result(type 8, 12 leaves):

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

Problem 43: Unable to integrate problem.

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

Optimal(type 4, 179 leaves, 12 steps):

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

Result(type 8, 16 leaves):

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

Problem 44: Unable to integrate problem.

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

Optimal(type 4, 147 leaves, 11 steps):

$$-\frac{2\,e^{\frac{2a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{2}\,\sqrt{a+b\,\mathrm{arcsinh}(c\,x)}}{\sqrt{b}}\right)\sqrt{2}\,\sqrt{\pi}}{3\,b^{5/2}\,c^2}+\frac{2\,\mathrm{erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\,\mathrm{arcsinh}(c\,x)}}{\sqrt{b}}\right)\sqrt{2}\,\sqrt{\pi}}{3\,b^{5/2}\,c^2\,e^{\frac{2a}{b}}}-\frac{2\,x\sqrt{c^2x^2+1}}{3\,b\,c\,(a+b\,\mathrm{arcsinh}(c\,x))^{3/2}}$$

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

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Result(type 8, 14 leaves):
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$$\int\frac{x}{(a+b\,\mathrm{arcsinh}(c\,x))^{5/2}}\,dx$$

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Problem 45: Unable to integrate problem.
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$$\int\frac{x}{(a+b\,\mathrm{arcsinh}(c\,x))^{7/2}}\,dx$$

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Optimal(type 4, 177 leaves, 9 steps):
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$$-\frac{4}{15\,b^2\,c^2\,(a+b\,\mathrm{arcsinh}(c\,x))^{3/2}}-\frac{8\,x^2}{15\,b^2\,(a+b\,\mathrm{arcsinh}(c\,x))^{3/2}}+\frac{8\,e^{\frac{2a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{2}\,\sqrt{a+b\,\mathrm{arcsinh}(c\,x)}}{\sqrt{b}}\right)\sqrt{2}\,\sqrt{\pi}}{15\,b^{7/2}\,c^2}$$

$$+\frac{8\,\mathrm{erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\,\mathrm{arcsinh}(c\,x)}}{\sqrt{b}}\right)\sqrt{2}\,\sqrt{\pi}}{15\,b^{7/2}\,c^2\,e^{\frac{2a}{b}}}-\frac{2\,x\sqrt{c^2x^2+1}}{5\,b\,c\,(a+b\,\mathrm{arcsinh}(c\,x))^{5/2}}-\frac{32\,x\sqrt{c^2x^2+1}}{15\,b^3\,c\sqrt{a+b\,\mathrm{arcsinh}(c\,x)}}$$

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Result(type 8, 14 leaves):
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$$\int\frac{x}{(a+b\,\mathrm{arcsinh}(c\,x))^{7/2}}\,dx$$

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Problem 46: Unable to integrate problem.
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$$\int\frac{1}{(a+b\,\mathrm{arcsinh}(c\,x))^{7/2}}\,dx$$

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Optimal(type 4, 141 leaves, 9 steps):
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$$-\frac{4\,x}{15\,b^2\,(a+b\,\mathrm{arcsinh}(c\,x))^{3/2}}-\frac{4\,e^{\frac{a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{a+b\,\mathrm{arcsinh}(c\,x)}}{\sqrt{b}}\right)\sqrt{\pi}}{15\,b^{7/2}\,c}+\frac{4\,\mathrm{erfi}\left(\frac{\sqrt{a+b\,\mathrm{arcsinh}(c\,x)}}{\sqrt{b}}\right)\sqrt{\pi}}{15\,b^{7/2}\,c\,e^{\frac{a}{b}}}-\frac{2\sqrt{c^2x^2+1}}{5\,b\,c\,(a+b\,\mathrm{arcsinh}(c\,x))^{5/2}}$$

$$-\frac{8\sqrt{c^2x^2+1}}{15b^3c\sqrt{a+b\operatorname{arcsinh}(cx)}}$$

Result(type 8, 12 leaves):

$$\int \frac{1}{(a+b\operatorname{arcsinh}(cx))^{7/2}}\,dx$$

Test results for the 178 problems in "7.1.4 (f x)^m (d+e x^2)^p (a+b arcsinh(c x))^n.txt"

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

$$\int x\left(c^2\pi x^2+\pi\right)^{3/2}(a+b\operatorname{arcsinh}(cx))\,dx$$

Optimal(type 3, 61 leaves, 3 steps):

$$-\frac{b\pi^{3/2}x}{5c}-\frac{2bc\pi^{3/2}x^3}{15}-\frac{bc^3\pi^{3/2}x^5}{25}+\frac{\left(c^2\pi x^2+\pi\right)^{5/2}(a+b\operatorname{arcsinh}(cx))}{5c^2\pi}$$

Result(type 3, 138 leaves):

$$\frac{a\left(c^2\pi x^2+\pi\right)^{5/2}}{5c^2\pi}+\frac{1}{75c^2\sqrt{c^2x^2+1}}\Big(b\pi^{3/2}\Big(15\operatorname{arcsinh}(cx)x^6c^6+45\operatorname{arcsinh}(cx)c^4x^4-3\sqrt{c^2x^2+1}\,x^5c^5+45\operatorname{arcsinh}(cx)c^2x^2-10c^3x^3\sqrt{c^2x^2+1}+15\operatorname{arcsinh}(cx)-15\sqrt{c^2x^2+1}\,cx\Big)\Big)$$

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

$$\int \frac{\left(c^2\pi x^2+\pi\right)^{3/2}(a+b\operatorname{arcsinh}(cx))}{x^4}\,dx$$

Optimal(type 3, 97 leaves, 6 steps):

$$-\frac{bc\pi^{3/2}}{6x^2}-\frac{\left(c^2\pi x^2+\pi\right)^{3/2}(a+b\operatorname{arcsinh}(cx))}{3x^3}+\frac{c^3\pi^{3/2}(a+b\operatorname{arcsinh}(cx))^2}{2b}+\frac{4bc^3\pi^{3/2}\ln(x)}{3}-\frac{c^2\pi(a+b\operatorname{arcsinh}(cx))\sqrt{c^2\pi x^2+\pi}}{x}$$

Result(type 3, 621 leaves):

$$-\frac{a\left(c^2\pi x^2+\pi\right)^{5/2}}{3\pi x^3}-\frac{2ac^2\left(c^2\pi x^2+\pi\right)^{5/2}}{3\pi x}+\frac{2ac^4x\left(c^2\pi x^2+\pi\right)^{3/2}}{3}+ac^4\sqrt{c^2\pi x^2+\pi}\,\pi x+\frac{ac^4\pi^2\ln\left(\frac{\pi xc^2}{\sqrt{c^2\pi}}+\sqrt{c^2\pi x^2+\pi}\right)}{\sqrt{c^2\pi}}+\frac{bc^3\pi^{3/2}\operatorname{arcsinh}(cx)^2}{2}-\frac{8b\pi^{3/2}c^3\operatorname{arcsinh}(cx)}{3}+\frac{32b\pi^{3/2}x^4\operatorname{arcsinh}(cx)c^7}{24c^4x^4+9c^2x^2+1}-\frac{32b\pi^{3/2}x^3\sqrt{c^2x^2+1}\operatorname{arcsinh}(cx)c^6}{24c^4x^4+9c^2x^2+1}$$

$$+\frac{8 b \pi^{3/2} x^4 c^7}{3 (24 c^4 x^4+9 c^2 x^2+1)}-\frac{8 b \pi^{3/2} x^2 (c^2 x^2+1) c^5}{3 (24 c^4 x^4+9 c^2 x^2+1)}+\frac{12 b \pi^{3/2} x^2 \operatorname{arcsinh}(c x) c^5}{24 c^4 x^4+9 c^2 x^2+1}-\frac{20 b \pi^{3/2} x \sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x) c^4}{24 c^4 x^4+9 c^2 x^2+1}$$
$$-\frac{4 b \pi^{3/2} (c^2 x^2+1) c^3}{3 (24 c^4 x^4+9 c^2 x^2+1)}+\frac{4 b \pi^{3/2} \operatorname{arcsinh}(c x) c^3}{3 (24 c^4 x^4+9 c^2 x^2+1)}-\frac{13 b \pi^{3/2} \sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x) c^2}{3 (24 c^4 x^4+9 c^2 x^2+1) x}-\frac{b \pi^{3/2} (c^2 x^2+1) c}{6 (24 c^4 x^4+9 c^2 x^2+1) x^2}$$
$$-\frac{b \pi^{3/2} \sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x)}{3 (24 c^4 x^4+9 c^2 x^2+1) x^3}+\frac{4 b c^3 \pi^{3/2} \ln\left(\left(c x+\sqrt{c^2 x^2+1}\right)^2-1\right)}{3}$$

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Problem 26: Result more than twice size of optimal antiderivative.
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$$\int \frac{x^4 (a+b \operatorname{arcsinh}(c x))}{(c^2 \pi x^2+\pi)^{3/2}}\, dx$$

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Optimal(type 3, 113 leaves, 7 steps):
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$$-\frac{b x^2}{4 c^3 \pi^{3/2}}-\frac{3 (a+b \operatorname{arcsinh}(c x))^2}{4 b c^5 \pi^{3/2}}-\frac{b \ln(c^2 x^2+1)}{2 c^5 \pi^{3/2}}-\frac{x^3 (a+b \operatorname{arcsinh}(c x))}{c^2 \pi \sqrt{c^2 \pi x^2+\pi}}+\frac{3 x (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 \pi x^2+\pi}}{2 c^4 \pi^2}$$

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Result(type 3, 268 leaves):
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$$\frac{a x^3}{2 c^2 \pi \sqrt{c^2 \pi x^2+\pi}}+\frac{3 a x}{2 c^4 \pi \sqrt{c^2 \pi x^2+\pi}}-\frac{3 a \ln\left(\frac{\pi x c^2}{\sqrt{c^2 \pi}}+\sqrt{c^2 \pi x^2+\pi}\right)}{2 c^4 \pi \sqrt{c^2 \pi}}-\frac{3 b \operatorname{arcsinh}(c x)^2}{4 c^5 \pi^{3/2}}+\frac{b x \operatorname{arcsinh}(c x) \sqrt{c^2 x^2+1}}{2 \pi^{3/2} c^4}-\frac{b x^2}{4 c^3 \pi^{3/2}}$$
$$+\frac{2 b \operatorname{arcsinh}(c x)}{c^5 \pi^{3/2}}-\frac{b}{8 \pi^{3/2} c^5}-\frac{b \operatorname{arcsinh}(c x) x^2}{\pi^{3/2} c^3 (c^2 x^2+1)}+\frac{b \operatorname{arcsinh}(c x) x}{\pi^{3/2} c^4 \sqrt{c^2 x^2+1}}-\frac{b \operatorname{arcsinh}(c x)}{\pi^{3/2} c^5 (c^2 x^2+1)}-\frac{b \ln\left(1+\left(c x+\sqrt{c^2 x^2+1}\right)^2\right)}{c^5 \pi^{3/2}}$$

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Problem 27: Result more than twice size of optimal antiderivative.
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$$\int \frac{x^3 (a+b \operatorname{arcsinh}(c x))}{(c^2 \pi x^2+\pi)^{3/2}}\, dx$$

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Optimal(type 3, 78 leaves, 4 steps):
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$$-\frac{b x}{c^3 \pi^{3/2}}-\frac{b \arctan(c x)}{c^4 \pi^{3/2}}+\frac{a+b \operatorname{arcsinh}(c x)}{c^4 \pi \sqrt{c^2 \pi x^2+\pi}}+\frac{(a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 \pi x^2+\pi}}{c^4 \pi^2}$$

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Result(type 3, 157 leaves):
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$$\frac{a x^2}{c^2 \pi \sqrt{c^2 \pi x^2+\pi}}+\frac{2 a}{\pi c^4 \sqrt{c^2 \pi x^2+\pi}}+\frac{b \sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x)}{\pi^{3/2} c^4}-\frac{b x}{c^3 \pi^{3/2}}+\frac{b \operatorname{arcsinh}(c x)}{\pi^{3/2} \sqrt{c^2 x^2+1}\, c^4}+\frac{I b \ln\left(c x+\sqrt{c^2 x^2+1}-I\right)}{c^4 \pi^{3/2}}$$

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

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

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

Optimal(type 3, 164 leaves, 11 steps):

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

Result(type 3, 969 leaves):

$$\frac{5 a x^3}{6 c^4 \pi (c^2 \pi x^2+\pi)^{3/2}}+\frac{5 a x}{2 c^6 \pi^2 \sqrt{c^2 \pi x^2+\pi}}-\frac{5 a \ln\left(\frac{\pi x c^2}{\sqrt{c^2 \pi}}+\sqrt{c^2 \pi x^2+\pi}\right)}{2 c^6 \pi^2 \sqrt{c^2 \pi}}+\frac{a x^5}{2 c^2 \pi (c^2 \pi x^2+\pi)^{3/2}}$$
$$-\frac{49 b}{6 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2 c^7}-\frac{b}{8 \pi^{5/2} c^7}-\frac{7 b \ln\left(1+\left(c x+\sqrt{c^2 x^2+1}\right)^2\right)}{3 c^7 \pi^{5/2}}+\frac{14 b \operatorname{arcsinh}(c x)}{3 c^7 \pi^{5/2}}-\frac{5 b \operatorname{arcsinh}(c x)^2}{4 c^7 \pi^{5/2}}$$
$$-\frac{b x^2}{4 c^5 \pi^{5/2}}+\frac{385 b \operatorname{arcsinh}(c x) x^5}{\pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^{3/2} c^2}+\frac{1009 b \operatorname{arcsinh}(c x) x^3}{3 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^{3/2} c^4}$$
$$+\frac{98 b x \operatorname{arcsinh}(c x)}{\pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^{3/2} c^6}-\frac{1463 b \operatorname{arcsinh}(c x) x^2}{3 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2 c^5}$$
$$-\frac{147 b c \operatorname{arcsinh}(c x) x^8}{\pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2}-\frac{553 b \operatorname{arcsinh}(c x) x^6}{\pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2 c}-\frac{2338 b \operatorname{arcsinh}(c x) x^4}{3 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2 c^3}$$
$$+\frac{147 b \operatorname{arcsinh}(c x) x^7}{\pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^{3/2}}+\frac{6 b x^2}{\pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1) c^5}+\frac{49 b x^6}{6 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1) c}$$
$$+\frac{14 b x^4}{\pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1) c^3}+\frac{b x \operatorname{arcsinh}(c x) \sqrt{c^2 x^2+1}}{2 \pi^{5/2} c^6}-\frac{49 b c x^8}{6 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2}$$
$$-\frac{98 b x^6}{3 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2 c}-\frac{49 b x^4}{\pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2 c^3}$$
$$-\frac{98 b x^2}{3 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2 c^5}-\frac{343 b \operatorname{arcsinh}(c x)}{3 \pi^{5/2} (63 c^4 x^4+111 c^2 x^2+49) (c^2 x^2+1)^2 c^7}$$

Problem 30: Result more than twice size of optimal antiderivative.

$$\int \frac{x^4 \, (a + b \operatorname{arcsinh}(c x))}{(c^2 \pi x^2 + \pi)^{5/2}} \, dx$$

Optimal(type 3, 121 leaves, 7 steps):

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

Result(type 3, 896 leaves):

$$- \frac{a x^3}{3 c^2 \pi (c^2 \pi x^2 + \pi)^{3/2}} - \frac{a x}{c^4 \pi^2 \sqrt{c^2 \pi x^2 + \pi}} + \frac{a \ln\left(\frac{\pi x c^2}{\sqrt{c^2 \pi}} + \sqrt{c^2 \pi x^2 + \pi}\right)}{c^4 \pi^2 \sqrt{c^2 \pi}} + \frac{b \operatorname{arcsinh}(c x)^2}{2 c^5 \pi^{5/2}} - \frac{8 b \operatorname{arcsinh}(c x)}{3 c^5 \pi^{5/2}}$$
$$+ \frac{32 b c^3 \operatorname{arcsinh}(c x) x^8}{\pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) (c^2 x^2 + 1)^2} - \frac{32 b c^2 \operatorname{arcsinh}(c x) x^7}{\pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) (c^2 x^2 + 1)^{3/2}} + \frac{8 b c^3 x^8}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) (c^2 x^2 + 1)^2}$$
$$- \frac{8 b c x^6}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) (c^2 x^2 + 1)} + \frac{116 b c \operatorname{arcsinh}(c x) x^6}{\pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) (c^2 x^2 + 1)^2} - \frac{76 b \operatorname{arcsinh}(c x) x^5}{\pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) (c^2 x^2 + 1)^{3/2}}$$
$$+ \frac{32 b c x^6}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) (c^2 x^2 + 1)^2} - \frac{4 b x^4}{\pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c (c^2 x^2 + 1)} + \frac{472 b \operatorname{arcsinh}(c x) x^4}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c (c^2 x^2 + 1)^2}$$
$$- \frac{181 b \operatorname{arcsinh}(c x) x^3}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c^2 (c^2 x^2 + 1)^{3/2}} + \frac{16 b x^4}{\pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c (c^2 x^2 + 1)^2} - \frac{3 b x^2}{2 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c^3 (c^2 x^2 + 1)}$$
$$+ \frac{284 b \operatorname{arcsinh}(c x) x^2}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c^3 (c^2 x^2 + 1)^2} - \frac{16 b x \operatorname{arcsinh}(c x)}{\pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c^4 (c^2 x^2 + 1)^{3/2}}$$
$$+ \frac{32 b x^2}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c^3 (c^2 x^2 + 1)^2} + \frac{64 b \operatorname{arcsinh}(c x)}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c^5 (c^2 x^2 + 1)^2}$$
$$+ \frac{8 b}{3 \pi^{5/2} (24 c^4 x^4 + 39 c^2 x^2 + 16) c^5 (c^2 x^2 + 1)^2} + \frac{4 b \ln\left(1 + \left(c x + \sqrt{c^2 x^2 + 1}\right)^2\right)}{3 c^5 \pi^{5/2}}$$

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

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

Optimal(type 3, 25 leaves, 2 steps):

$$a \ln(x) - \frac{\operatorname{arcsinh}(a x) \sqrt{a^2 x^2 + 1}}{x}$$

Result(type 3, 55 leaves):

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

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

$$\int x^3\,(a+b\,\mathrm{arcsinh}(c\,x))\,\sqrt{c^2\,d\,x^2+d}\;\mathrm{d}x$$

Optimal(type 3, 149 leaves, 3 steps):

$$-\frac{\left(c^2\,d\,x^2+d\right)^{3/2}(a+b\,\mathrm{arcsinh}(c\,x))}{3\,c^4\,d}+\frac{\left(c^2\,d\,x^2+d\right)^{5/2}(a+b\,\mathrm{arcsinh}(c\,x))}{5\,c^4\,d^2}+\frac{2\,b\,x\sqrt{c^2\,d\,x^2+d}}{15\,c^3\sqrt{c^2\,x^2+1}}-\frac{b\,x^3\sqrt{c^2\,d\,x^2+d}}{45\,c\sqrt{c^2\,x^2+1}}-\frac{b\,c\,x^5\sqrt{c^2\,d\,x^2+d}}{25\sqrt{c^2\,x^2+1}}$$

Result(type 3, 577 leaves):

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

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

$$\int x\,(a+b\,\mathrm{arcsinh}(c\,x))\,\sqrt{c^2\,d\,x^2+d}\;\mathrm{d}x$$

Optimal(type 3, 89 leaves, 2 steps):

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

Result(type 3, 320 leaves):

$$\frac{a\left(c^2\,d\,x^2+d\right)^{3/2}}{3\,c^2\,d}+b\left(\frac{\sqrt{d\left(c^2\,x^2+1\right)}\left(4\,c^4\,x^4+4\,c^3\,x^3\sqrt{c^2\,x^2+1}+5\,c^2\,x^2+3\sqrt{c^2\,x^2+1}\,c\,x+1\right)(-1+3\,\mathrm{arcsinh}(c\,x))}{72\left(c^2\,x^2+1\right)c^2}\right.$$

$$+\frac{\sqrt{d\,(c^2x^2+1)}\,\left(c^2x^2+\sqrt{c^2x^2+1}\,cx+1\right)(-1+\operatorname{arcsinh}(cx))}{8\,(c^2x^2+1)\,c^2}+\frac{\sqrt{d\,(c^2x^2+1)}\,\left(c^2x^2-\sqrt{c^2x^2+1}\,cx+1\right)(1+\operatorname{arcsinh}(cx))}{8\,(c^2x^2+1)\,c^2}$$

$$+\frac{\sqrt{d\,(c^2x^2+1)}\,\left(4c^4x^4-4c^3x^3\sqrt{c^2x^2+1}+5c^2x^2-3\sqrt{c^2x^2+1}\,cx+1\right)(1+3\operatorname{arcsinh}(cx))}{72\,(c^2x^2+1)\,c^2}\Bigg)$$

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

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

Optimal(type 3, 154 leaves, 6 steps):

$$\frac{x\,(c^2dx^2+d)^{3/2}\,(a+b\operatorname{arcsinh}(cx))}{4}+\frac{3dx\,(a+b\operatorname{arcsinh}(cx))\sqrt{c^2dx^2+d}}{8}-\frac{5bcdx^2\sqrt{c^2dx^2+d}}{16\sqrt{c^2x^2+1}}-\frac{bc^3dx^4\sqrt{c^2dx^2+d}}{16\sqrt{c^2x^2+1}}$$

$$+\frac{3d\,(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2dx^2+d}}{16bc\sqrt{c^2x^2+1}}$$

Result(type 3, 317 leaves):

$$\frac{ax\,(c^2dx^2+d)^{3/2}}{4}+\frac{3adx\sqrt{c^2dx^2+d}}{8}+\frac{3ad^2\ln\left(\frac{xc^2d}{\sqrt{c^2d}}+\sqrt{c^2dx^2+d}\right)}{8\sqrt{c^2d}}+\frac{3b\sqrt{d\,(c^2x^2+1)}\operatorname{arcsinh}(cx)^2d}{16\sqrt{c^2x^2+1}\,c}-\frac{17b\sqrt{d\,(c^2x^2+1)}\,d}{128c\sqrt{c^2x^2+1}}$$

$$+\frac{b\sqrt{d\,(c^2x^2+1)}\,dc^4\operatorname{arcsinh}(cx)\,x^5}{4\,(c^2x^2+1)}-\frac{b\sqrt{d\,(c^2x^2+1)}\,dc^3x^4}{16\sqrt{c^2x^2+1}}+\frac{7b\sqrt{d\,(c^2x^2+1)}\,dc^2\operatorname{arcsinh}(cx)\,x^3}{8\,(c^2x^2+1)}-\frac{5b\sqrt{d\,(c^2x^2+1)}\,dcx^2}{16\sqrt{c^2x^2+1}}$$

$$+\frac{5b\sqrt{d\,(c^2x^2+1)}\,dx\operatorname{arcsinh}(cx)}{8\,(c^2x^2+1)}$$

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

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

Optimal(type 3, 155 leaves, 6 steps):

$$-\frac{(c^2dx^2+d)^{3/2}\,(a+b\operatorname{arcsinh}(cx))}{x}+\frac{3c^2dx\,(a+b\operatorname{arcsinh}(cx))\sqrt{c^2dx^2+d}}{2}-\frac{bc^3dx^2\sqrt{c^2dx^2+d}}{4\sqrt{c^2x^2+1}}+\frac{3cd\,(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2dx^2+d}}{4b\sqrt{c^2x^2+1}}$$

$$+\frac{bcd\ln(x)\sqrt{c^2dx^2+d}}{\sqrt{c^2x^2+1}}$$

Result(type 3, 391 leaves):

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

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

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

Optimal(type 3, 122 leaves, 4 steps):

$$\frac{2 b x \sqrt{c^2 x^2+1}}{3 c^3 \sqrt{c^2 d x^2+d}}-\frac{b x^3 \sqrt{c^2 x^2+1}}{9 c \sqrt{c^2 d x^2+d}}-\frac{2\left(a+b \operatorname{arcsinh}(c x)\right) \sqrt{c^2 d x^2+d}}{3 c^4 d}+\frac{x^2\left(a+b \operatorname{arcsinh}(c x)\right) \sqrt{c^2 d x^2+d}}{3 c^2 d}$$

Result(type 3, 357 leaves):

$$a\left(\frac{x^2 \sqrt{c^2 d x^2+d}}{3 c^2 d}-\frac{2 \sqrt{c^2 d x^2+d}}{3 d c^4}\right)+b\left(\frac{\left(-1+3 \operatorname{arcsinh}(c x)\right) \sqrt{d\left(c^2 x^2+1\right)}\left(4 c^4 x^4+4 c^3 x^3 \sqrt{c^2 x^2+1}+5 c^2 x^2+3 \sqrt{c^2 x^2+1}\, c x+1\right)}{72 c^4 d\left(c^2 x^2+1\right)}\right.$$
$$-\frac{3\left(-1+\operatorname{arcsinh}(c x)\right) \sqrt{d\left(c^2 x^2+1\right)}\left(c^2 x^2+\sqrt{c^2 x^2+1}\, c x+1\right)}{8 c^4 d\left(c^2 x^2+1\right)}-\frac{3\left(1+\operatorname{arcsinh}(c x)\right) \sqrt{d\left(c^2 x^2+1\right)}\left(c^2 x^2-\sqrt{c^2 x^2+1}\, c x+1\right)}{8 c^4 d\left(c^2 x^2+1\right)}$$
$$\left.+\frac{\left(1+3 \operatorname{arcsinh}(c x)\right) \sqrt{d\left(c^2 x^2+1\right)}\left(4 c^4 x^4-4 c^3 x^3 \sqrt{c^2 x^2+1}+5 c^2 x^2-3 \sqrt{c^2 x^2+1}\, c x+1\right)}{72 c^4 d\left(c^2 x^2+1\right)}\right)$$

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

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

Optimal(type 3, 103 leaves, 3 steps):

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

Result(type 3, 246 leaves):

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

Problem 44: Result more than twice size of optimal antiderivative.

$$\int \frac{a+b \operatorname{arcsinh}(c x)}{x^2 \sqrt{c^2 d x^2+d}}\, \mathrm{d}x$$

Optimal(type 3, 57 leaves, 2 steps):

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

Result(type 3, 182 leaves):

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

Problem 46: Result more than twice size of optimal antiderivative.

$$\int \frac{x^4 (a+b \operatorname{arcsinh}(c x))}{\left(c^2 d x^2+d\right)^{3/2}}\, \mathrm{d}x$$

Optimal(type 3, 182 leaves, 7 steps):

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

Result(type 3, 365 leaves):

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

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

```
Problem 47: Result more than twice size of optimal antiderivative.
```

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

```
Optimal(type 3, 245 leaves, 11 steps):
```

$$-\frac{x^5(a+b\operatorname{arcsinh}(cx))}{3c^2d(c^2dx^2+d)^{3/2}}-\frac{5x^3(a+b\operatorname{arcsinh}(cx))}{3c^4d^2\sqrt{c^2dx^2+d}}-\frac{b}{6c^7d^2\sqrt{c^2x^2+1}\sqrt{c^2dx^2+d}}-\frac{bx^2\sqrt{c^2x^2+1}}{4c^5d^2\sqrt{c^2dx^2+d}}-\frac{5(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2x^2+1}}{4bc^7d^2\sqrt{c^2dx^2+d}}$$
$$-\frac{7b\ln(c^2x^2+1)\sqrt{c^2x^2+1}}{6c^7d^2\sqrt{c^2dx^2+d}}+\frac{5x(a+b\operatorname{arcsinh}(cx))\sqrt{c^2dx^2+d}}{2c^6d^3}$$

```
Result(type 3, 1606 leaves):
```

$$-\frac{147b\sqrt{d(c^2x^2+1)}\sqrt{c^2x^2+1}\operatorname{arcsinh}(cx)x^6}{(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)cd^3}-\frac{1120b\sqrt{d(c^2x^2+1)}\sqrt{c^2x^2+1}\operatorname{arcsinh}(cx)x^2}{3(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^5d^3}$$
$$-\frac{406b\sqrt{d(c^2x^2+1)}\sqrt{c^2x^2+1}\operatorname{arcsinh}(cx)x^4}{(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^3d^3}-\frac{5b\sqrt{d(c^2x^2+1)}\operatorname{arcsinh}(cx)^2}{4\sqrt{c^2x^2+1}\,c^7d^3}+\frac{14b\sqrt{d(c^2x^2+1)}\operatorname{arcsinh}(cx)}{3\sqrt{c^2x^2+1}\,c^7d^3}$$
$$+\frac{147b\sqrt{d(c^2x^2+1)}\operatorname{arcsinh}(cx)x^7}{(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)d^3}-\frac{7b\sqrt{d(c^2x^2+1)}\ln\left(1+\left(cx+\sqrt{c^2x^2+1}\right)^2\right)}{3\sqrt{c^2x^2+1}\,c^7d^3}$$
$$+\frac{70b\sqrt{d(c^2x^2+1)}x^5}{3(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^2d^3}+\frac{133b\sqrt{d(c^2x^2+1)}x^3}{6(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^4d^3}$$
$$+\frac{7b\sqrt{d(c^2x^2+1)}x}{(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^6d^3}-\frac{49b\sqrt{d(c^2x^2+1)}\sqrt{c^2x^2+1}}{6(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^7d^3}-\frac{b\sqrt{d(c^2x^2+1)}x^2}{4c^5d^3\sqrt{c^2x^2+1}}$$
$$+\frac{b\sqrt{d(c^2x^2+1)}\operatorname{arcsinh}(cx)x^3}{2c^4d^3(c^2x^2+1)}+\frac{b\sqrt{d(c^2x^2+1)}x\operatorname{arcsinh}(cx)}{2c^6d^3(c^2x^2+1)}-\frac{49b\sqrt{d(c^2x^2+1)}(c^2x^2+1)x^5}{6(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^2d^3}$$
$$+\frac{385b\sqrt{d(c^2x^2+1)}\operatorname{arcsinh}(cx)x^5}{(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^2d^3}-\frac{21b\sqrt{d(c^2x^2+1)}x^4\sqrt{c^2x^2+1}}{2(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^3d^3}$$
$$-\frac{91b\sqrt{d(c^2x^2+1)}(c^2x^2+1)x^3}{6(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^4d^3}+\frac{1009b\sqrt{d(c^2x^2+1)}\operatorname{arcsinh}(cx)x^3}{3(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^4d^3}$$
$$-\frac{37b\sqrt{d(c^2x^2+1)}x^2\sqrt{c^2x^2+1}}{2(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^5d^3}-\frac{7b\sqrt{d(c^2x^2+1)}(c^2x^2+1)x}{(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)c^6d^3}$$

$$+\frac{98\,b\sqrt{d\,(c^2x^2+1)}\,x\operatorname{arcsinh}(cx)}{(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)\,c^6d^3}-\frac{343\,b\sqrt{d\,(c^2x^2+1)}\,\sqrt{c^2x^2+1}\,\operatorname{arcsinh}(cx)}{3\,(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)\,c^7d^3}$$

$$+\frac{49\,b\sqrt{d\,(c^2x^2+1)}\,x^7}{6\,(63c^8x^8+237x^6c^6+334c^4x^4+209c^2x^2+49)\,d^3}+\frac{a\,x^5}{2c^2d\,(c^2dx^2+d)^{3/2}}+\frac{5\,a\,x^3}{6c^4d\,(c^2dx^2+d)^{3/2}}+\frac{5\,a\,x}{2c^6d^2\sqrt{c^2dx^2+d}}$$

$$-\frac{5\,a\ln\left(\frac{x\,c^2d}{\sqrt{c^2d}}+\sqrt{c^2dx^2+d}\right)}{2c^6d^2\sqrt{c^2d}}-\frac{b\sqrt{d\,(c^2x^2+1)}}{8c^7d^3\sqrt{c^2x^2+1}}$$

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

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

Optimal(type 3, 179 leaves, 7 steps):

$$-\frac{x^3\,(a+b\operatorname{arcsinh}(cx))}{3c^2d\,(c^2dx^2+d)^{3/2}}-\frac{x\,(a+b\operatorname{arcsinh}(cx))}{c^4d^2\sqrt{c^2dx^2+d}}+\frac{b}{6c^5d^2\sqrt{c^2x^2+1}\,\sqrt{c^2dx^2+d}}+\frac{(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2x^2+1}}{2bc^5d^2\sqrt{c^2dx^2+d}}+\frac{2b\ln(c^2x^2+1)\sqrt{c^2x^2+1}}{3c^5d^2\sqrt{c^2dx^2+d}}$$

Result(type 3, 1429 leaves):

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

$$-\frac{32\,b\sqrt{d\,(c^2x^2+1)}\,c^2\operatorname{arcsinh}(cx)\,x^7}{(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3}+\frac{32\,b\sqrt{d\,(c^2x^2+1)}\,c\operatorname{arcsinh}(cx)\sqrt{c^2x^2+1}\,x^6}{(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3}$$

$$-\frac{8\,b\sqrt{d\,(c^2x^2+1)}\,c^2x^7}{3\,(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3}+\frac{8\,b\sqrt{d\,(c^2x^2+1)}\,(c^2x^2+1)\,x^5}{3\,(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3}$$

$$-\frac{76\,b\sqrt{d\,(c^2x^2+1)}\,\operatorname{arcsinh}(cx)\,x^5}{(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3}+\frac{84\,b\sqrt{d\,(c^2x^2+1)}\,\operatorname{arcsinh}(cx)\sqrt{c^2x^2+1}\,x^4}{(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3c}$$

$$-\frac{22\,b\sqrt{d\,(c^2x^2+1)}\,x^5}{3\,(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3}+\frac{4\,b\sqrt{d\,(c^2x^2+1)}\,\sqrt{c^2x^2+1}\,x^4}{(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3c}$$

$$+\frac{14\,b\sqrt{d\,(c^2x^2+1)}\,(c^2x^2+1)\,x^3}{3\,(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3c^2}-\frac{181\,b\sqrt{d\,(c^2x^2+1)}\,\operatorname{arcsinh}(cx)\,x^3}{3\,(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3c^2}$$

$$+\frac{220\,b\sqrt{d\,(c^2x^2+1)}\,\operatorname{arcsinh}(cx)\sqrt{c^2x^2+1}\,x^2}{3\,(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3c^3}-\frac{20\,b\sqrt{d\,(c^2x^2+1)}\,x^3}{3\,(24c^8x^8+87x^6c^6+118c^4x^4+71c^2x^2+16)\,d^3c^2}$$

$$+\frac{13 b \sqrt{d\left(c^2 x^2+1\right)}\, x^2 \sqrt{c^2 x^2+1}}{2\left(24 c^8 x^8+87 x^6 c^6+118 c^4 x^4+71 c^2 x^2+16\right) d^3 c^3}+\frac{2 b \sqrt{d\left(c^2 x^2+1\right)}\left(c^2 x^2+1\right) x}{\left(24 c^8 x^8+87 x^6 c^6+118 c^4 x^4+71 c^2 x^2+16\right) d^3 c^4}$$

$$-\frac{16 b \sqrt{d\left(c^2 x^2+1\right)}\, x \operatorname{arcsinh}(c x)}{\left(24 c^8 x^8+87 x^6 c^6+118 c^4 x^4+71 c^2 x^2+16\right) d^3 c^4}+\frac{64 b \sqrt{d\left(c^2 x^2+1\right)} \operatorname{arcsinh}(c x) \sqrt{c^2 x^2+1}}{3\left(24 c^8 x^8+87 x^6 c^6+118 c^4 x^4+71 c^2 x^2+16\right) d^3 c^5}$$

$$-\frac{2 b \sqrt{d\left(c^2 x^2+1\right)}\, x}{\left(24 c^8 x^8+87 x^6 c^6+118 c^4 x^4+71 c^2 x^2+16\right) d^3 c^4}+\frac{8 b \sqrt{d\left(c^2 x^2+1\right)} \sqrt{c^2 x^2+1}}{3\left(24 c^8 x^8+87 x^6 c^6+118 c^4 x^4+71 c^2 x^2+16\right) d^3 c^5}$$

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

```
Problem 51: Unable to integrate problem.
```

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

```
Optimal(type 5, 88 leaves, 1 step):
```

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

```
Result(type 8, 21 leaves):
```

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

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

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

```
Optimal(type 4, 197 leaves, 10 steps):
```

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

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

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

```
Result(type 4, 514 leaves):
```

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

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

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

```
Optimal(type 4, 334 leaves, 26 steps):
```

$$\frac{71 b^2 c^2 d^3 x^2}{144} + \frac{7 b^2 c^4 d^3 x^4}{144} + \frac{b^2 d^3 (c^2 x^2+1)^3}{108} - \frac{7 b c d^3 x (c^2 x^2+1)^{3/2} (a + b \operatorname{arcsinh}(c x))}{36} - \frac{b c d^3 x (c^2 x^2+1)^{5/2} (a + b \operatorname{arcsinh}(c x))}{18}$$
$$- \frac{19 d^3 (a + b \operatorname{arcsinh}(c x))^2}{48} + \frac{d^3 (c^2 x^2+1) (a + b \operatorname{arcsinh}(c x))^2}{2} + \frac{d^3 (c^2 x^2+1)^2 (a + b \operatorname{arcsinh}(c x))^2}{4} + \frac{d^3 (c^2 x^2+1)^3 (a + b \operatorname{arcsinh}(c x))^2}{6}$$
$$+ \frac{d^3 (a + b \operatorname{arcsinh}(c x))^3}{3 b} + d^3 (a + b \operatorname{arcsinh}(c x))^2 \ln\left(1 - \frac{1}{\left(c x + \sqrt{c^2 x^2+1}\right)^2}\right) - b d^3 (a + b \operatorname{arcsinh}(c x)) \operatorname{polylog}\left(2, \frac{1}{\left(c x + \sqrt{c^2 x^2+1}\right)^2}\right)$$
$$- \frac{b^2 d^3 \operatorname{polylog}\left(3, \frac{1}{\left(c x + \sqrt{c^2 x^2+1}\right)^2}\right)}{2} - \frac{19 b c d^3 x (a + b \operatorname{arcsinh}(c x)) \sqrt{c^2 x^2+1}}{24}$$

```
Result(type 4, 705 leaves):
```

$$2 d^3 a b \operatorname{polylog}\left(2, c x + \sqrt{c^2 x^2+1}\right) + 2 d^3 a b \operatorname{polylog}\left(2, -c x - \sqrt{c^2 x^2+1}\right) + \frac{25 d^3 a b \operatorname{arcsinh}(c x)}{24} - d^3 a b \operatorname{arcsinh}(c x)^2 + 2 d^3 b^2 \operatorname{arcsinh}(c x) \operatorname{polylog}\left(2, c x + \sqrt{c^2 x^2+1}\right) + 2 d^3 b^2 \operatorname{arcsinh}(c x) \operatorname{polylog}\left(2, -c x - \sqrt{c^2 x^2+1}\right) + d^3 b^2 \operatorname{arcsinh}(c x)^2 \ln\left(1 - c x - \sqrt{c^2 x^2+1}\right) + d^3 b^2 \operatorname{arcsinh}(c x)^2 \ln\left(1 + c x + \sqrt{c^2 x^2+1}\right) + \frac{d^3 a^2 c^6 x^6}{6} + \frac{3 d^3 a^2 c^4 x^4}{4} + \frac{3 d^3 a^2 c^2 x^2}{2} + \frac{d^3 b^2 c^6 x^6}{108} + d^3 a^2 \ln(c x) - \frac{d^3 b^2 \operatorname{arcsinh}(c x)^3}{3} - 2 d^3 b^2 \operatorname{polylog}\left(3, c x + \sqrt{c^2 x^2+1}\right)$$
$$- 2 d^3 b^2 \operatorname{polylog}\left(3, -c x - \sqrt{c^2 x^2+1}\right) + \frac{25 d^3 b^2 \operatorname{arcsinh}(c x)^2}{48} + 2 d^3 a b \operatorname{arcsinh}(c x) \ln\left(1 - c x - \sqrt{c^2 x^2+1}\right) + 2 d^3 a b \operatorname{arcsinh}(c x) \ln\left(1 + c x + \sqrt{c^2 x^2+1}\right) + \frac{25 b^2 c^2 d^3 x^2}{48} + \frac{11 b^2 c^4 d^3 x^4}{144} + \frac{d^3 b^2 \operatorname{arcsinh}(c x)^2 c^6 x^6}{6} + \frac{3 d^3 b^2 \operatorname{arcsinh}(c x)^2 c^4 x^4}{4} + \frac{3 d^3 b^2 \operatorname{arcsinh}(c x)^2 c^2 x^2}{2}$$

$$+\frac{d^3 a b \operatorname{arcsinh}(cx) c^6 x^6}{3}+3 d^3 a b \operatorname{arcsinh}(cx) c^2 x^2+\frac{3 d^3 a b \operatorname{arcsinh}(cx) c^4 x^4}{2}-\frac{25 d^3 a b c x \sqrt{c^2 x^2+1}}{24}-\frac{d^3 a b c^5 x^5 \sqrt{c^2 x^2+1}}{18}$$
$$-\frac{11 d^3 a b c^3 x^3 \sqrt{c^2 x^2+1}}{36}-\frac{25 d^3 b^2 \sqrt{c^2 x^2+1} \operatorname{arcsinh}(cx) c x}{24}-\frac{d^3 b^2 \sqrt{c^2 x^2+1} \operatorname{arcsinh}(cx) c^5 x^5}{18}-\frac{11 d^3 b^2 \sqrt{c^2 x^2+1} \operatorname{arcsinh}(cx) c^3 x^3}{36}$$
$$+\frac{811 d^3 b^2}{3456}$$

Problem 59: Unable to integrate problem.

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

Optimal(type 4, 300 leaves, 16 steps):

$$-\frac{22 b^2 x}{9 c^4 d}+\frac{2 b^2 x^3}{27 c^2 d}-\frac{x (a+b \operatorname{arcsinh}(cx))^2}{c^4 d}+\frac{x^3 (a+b \operatorname{arcsinh}(cx))^2}{3 c^2 d}+\frac{2 (a+b \operatorname{arcsinh}(cx))^2 \arctan\left(cx+\sqrt{c^2 x^2+1}\right)}{c^5 d}$$
$$-\frac{2 I b (a+b \operatorname{arcsinh}(cx)) \operatorname{polylog}\left(2,-I\left(cx+\sqrt{c^2 x^2+1}\right)\right)}{c^5 d}+\frac{2 I b (a+b \operatorname{arcsinh}(cx)) \operatorname{polylog}\left(2, I\left(cx+\sqrt{c^2 x^2+1}\right)\right)}{c^5 d}$$
$$+\frac{2 I b^2 \operatorname{polylog}\left(3,-I\left(cx+\sqrt{c^2 x^2+1}\right)\right)}{c^5 d}-\frac{2 I b^2 \operatorname{polylog}\left(3, I\left(cx+\sqrt{c^2 x^2+1}\right)\right)}{c^5 d}+\frac{22 b (a+b \operatorname{arcsinh}(cx)) \sqrt{c^2 x^2+1}}{9 c^5 d}$$
$$-\frac{2 b x^2 (a+b \operatorname{arcsinh}(cx)) \sqrt{c^2 x^2+1}}{9 c^3 d}$$

Result(type 8, 28 leaves):

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

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

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

Optimal(type 4, 157 leaves, 9 steps):

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

Result(type 4, 353 leaves):

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

Problem 62: Unable to integrate problem.

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

Optimal(type 4, 269 leaves, 15 steps):

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

Result(type 8, 28 leaves):

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

Problem 63: Unable to integrate problem.

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

Optimal(type 4, 348 leaves, 24 steps):

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

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

Result(type 8, 28 leaves):

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

Problem 64: Unable to integrate problem.

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

Optimal(type 4, 243 leaves, 11 steps):

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

Result(type 8, 25 leaves):

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

Problem 65: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 228 leaves, 12 steps):

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

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

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

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Result(type 4, 723 leaves):
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$$\frac{a\,b\,\mathrm{arcsinh}(c\,x)}{d^2\,(c^2\,x^2+1)}-\frac{2\,a\,b\,\mathrm{arcsinh}(c\,x)\,\ln\left(1+\left(c\,x+\sqrt{c^2\,x^2+1}\right)^2\right)}{d^2}+\frac{2\,a\,b\,\mathrm{arcsinh}(c\,x)\,\ln\left(1+c\,x+\sqrt{c^2\,x^2+1}\right)}{d^2}$$

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

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

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

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

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

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

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

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Problem 66: Unable to integrate problem.
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$$\int\frac{(a+b\,\mathrm{arcsinh}(c\,x))^2}{x^4\,(c^2\,d\,x^2+d)^2}\,dx$$

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Optimal(type 4, 444 leaves, 32 steps):
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$$-\frac{b^2\,c^2}{3\,d^2\,x}-\frac{(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,d^2\,x^3\,(c^2\,x^2+1)}+\frac{5\,c^2\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,d^2\,x\,(c^2\,x^2+1)}+\frac{5\,c^4\,x\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{2\,d^2\,(c^2\,x^2+1)}+\frac{5\,c^3\,(a+b\,\mathrm{arcsinh}(c\,x))^2\,\arctan\left(c\,x+\sqrt{c^2\,x^2+1}\right)}{d^2}$$

$$-\frac{b^2\,c^3\,\arctan(c\,x)}{d^2}+\frac{26\,b\,c^3\,(a+b\,\mathrm{arcsinh}(c\,x))\,\mathrm{arctanh}\left(c\,x+\sqrt{c^2\,x^2+1}\right)}{3\,d^2}+\frac{13\,b^2\,c^3\,\mathrm{polylog}\left(2,-c\,x-\sqrt{c^2\,x^2+1}\right)}{3\,d^2}$$

$$-\frac{5 I b c^3 (a+b\operatorname{arcsinh}(cx))\operatorname{polylog}\left(2,-I\left(cx+\sqrt{c^2x^2+1}\right)\right)}{d^2}+\frac{5 I b c^3 (a+b\operatorname{arcsinh}(cx))\operatorname{polylog}\left(2,I\left(cx+\sqrt{c^2x^2+1}\right)\right)}{d^2}$$
$$-\frac{13 b^2 c^3\operatorname{polylog}\left(2,cx+\sqrt{c^2x^2+1}\right)}{3d^2}+\frac{5 I b^2 c^3\operatorname{polylog}\left(3,-I\left(cx+\sqrt{c^2x^2+1}\right)\right)}{d^2}-\frac{5 I b^2 c^3\operatorname{polylog}\left(3,I\left(cx+\sqrt{c^2x^2+1}\right)\right)}{d^2}$$
$$+\frac{2 b c^3 (a+b\operatorname{arcsinh}(cx))}{3 d^2\sqrt{c^2x^2+1}}-\frac{b c (a+b\operatorname{arcsinh}(cx))}{3 d^2 x^2\sqrt{c^2x^2+1}}$$

Result(type 8, 28 leaves):

$$\int\frac{(a+b\operatorname{arcsinh}(cx))^2}{x^4\left(c^2dx^2+d\right)^2}\,dx$$

Problem 67: Unable to integrate problem.

$$\int\frac{x^4 (a+b\operatorname{arcsinh}(cx))^2}{\left(c^2dx^2+d\right)^3}\,dx$$

Optimal(type 4, 331 leaves, 16 steps):

$$-\frac{b^2 x}{12 c^4 d^3\left(c^2x^2+1\right)}+\frac{b (a+b\operatorname{arcsinh}(cx))}{6 c^5 d^3\left(c^2x^2+1\right)^{3/2}}-\frac{x^3 (a+b\operatorname{arcsinh}(cx))^2}{4 c^2 d^3\left(c^2x^2+1\right)^2}-\frac{3x (a+b\operatorname{arcsinh}(cx))^2}{8 c^4 d^3\left(c^2x^2+1\right)}+\frac{3 (a+b\operatorname{arcsinh}(cx))^2\arctan\left(cx+\sqrt{c^2x^2+1}\right)}{4c^5d^3}$$
$$+\frac{7b^2\arctan(cx)}{6c^5d^3}-\frac{3 I b (a+b\operatorname{arcsinh}(cx))\operatorname{polylog}\left(2,-I\left(cx+\sqrt{c^2x^2+1}\right)\right)}{4c^5d^3}+\frac{3 I b (a+b\operatorname{arcsinh}(cx))\operatorname{polylog}\left(2,I\left(cx+\sqrt{c^2x^2+1}\right)\right)}{4c^5d^3}$$
$$+\frac{3 I b^2\operatorname{polylog}\left(3,-I\left(cx+\sqrt{c^2x^2+1}\right)\right)}{4c^5d^3}-\frac{3 I b^2\operatorname{polylog}\left(3,I\left(cx+\sqrt{c^2x^2+1}\right)\right)}{4c^5d^3}-\frac{5 b (a+b\operatorname{arcsinh}(cx))}{4c^5d^3\sqrt{c^2x^2+1}}$$

Result(type 8, 28 leaves):

$$\int\frac{x^4 (a+b\operatorname{arcsinh}(cx))^2}{\left(c^2dx^2+d\right)^3}\,dx$$

Problem 68: Unable to integrate problem.

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

Optimal(type 4, 320 leaves, 15 steps):

$$-\frac{b^2 x}{12 d^3\left(c^2x^2+1\right)}+\frac{b (a+b\operatorname{arcsinh}(cx))}{6 c d^3\left(c^2x^2+1\right)^{3/2}}+\frac{x (a+b\operatorname{arcsinh}(cx))^2}{4 d^3\left(c^2x^2+1\right)^2}+\frac{3x (a+b\operatorname{arcsinh}(cx))^2}{8 d^3\left(c^2x^2+1\right)}+\frac{3 (a+b\operatorname{arcsinh}(cx))^2\arctan\left(cx+\sqrt{c^2x^2+1}\right)}{4cd^3}$$

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

Result(type 8, 25 leaves):

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

Problem 69: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 402 leaves, 23 steps):

$$\frac{b^2 c^2}{12 d^3 \left(c^2 x^2 + 1\right)} - \frac{b c \left(a + b \operatorname{arcsinh}(c x)\right)}{d^3 x \left(c^2 x^2 + 1\right)^{3/2}} - \frac{5 b c^3 x \left(a + b \operatorname{arcsinh}(c x)\right)}{6 d^3 \left(c^2 x^2 + 1\right)^{3/2}} - \frac{3 c^2 \left(a + b \operatorname{arcsinh}(c x)\right)^2}{4 d^3 \left(c^2 x^2 + 1\right)^2} - \frac{\left(a + b \operatorname{arcsinh}(c x)\right)^2}{2 d^3 x^2 \left(c^2 x^2 + 1\right)^2}$$
$$- \frac{3 c^2 \left(a + b \operatorname{arcsinh}(c x)\right)^2}{2 d^3 \left(c^2 x^2 + 1\right)} + \frac{6 c^2 \left(a + b \operatorname{arcsinh}(c x)\right)^2 \operatorname{arctanh}\left(\left(c x + \sqrt{c^2 x^2 + 1}\right)^2\right)}{d^3} + \frac{b^2 c^2 \ln(x)}{d^3} - \frac{7 b^2 c^2 \ln\left(c^2 x^2 + 1\right)}{6 d^3}$$
$$+ \frac{3 b c^2 \left(a + b \operatorname{arcsinh}(c x)\right) \operatorname{polylog}\left(2, -\left(c x + \sqrt{c^2 x^2 + 1}\right)^2\right)}{d^3} - \frac{3 b c^2 \left(a + b \operatorname{arcsinh}(c x)\right) \operatorname{polylog}\left(2, \left(c x + \sqrt{c^2 x^2 + 1}\right)^2\right)}{d^3}$$
$$- \frac{3 b^2 c^2 \operatorname{polylog}\left(3, -\left(c x + \sqrt{c^2 x^2 + 1}\right)^2\right)}{2 d^3} + \frac{3 b^2 c^2 \operatorname{polylog}\left(3, \left(c x + \sqrt{c^2 x^2 + 1}\right)^2\right)}{2 d^3} + \frac{4 b c^3 x \left(a + b \operatorname{arcsinh}(c x)\right)}{3 d^3 \sqrt{c^2 x^2 + 1}}$$

Result(type 4, 1435 leaves):

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

$$-\frac{3 c^2 a^2 \ln(c x)}{d^3}+\frac{3 c^2 a^2 \ln(c^2 x^2+1)}{2 d^3}+\frac{c^2 b^2 \ln\left(c x+\sqrt{c^2 x^2+1}-1\right)}{d^3}+\frac{8 c^2 b^2 \ln\left(c x+\sqrt{c^2 x^2+1}\right)}{3 d^3}-\frac{7 c^2 b^2 \ln\left(1+\left(c x+\sqrt{c^2 x^2+1}\right)^2\right)}{3 d^3}$$
$$+\frac{c^2 b^2 \ln\left(1+c x+\sqrt{c^2 x^2+1}\right)}{d^3}+\frac{6 c^2 b^2 \operatorname{polylog}\left(3, c x+\sqrt{c^2 x^2+1}\right)}{d^3}-\frac{a^2}{2 d^3 x^2}-\frac{3 b^2 c^2 \operatorname{polylog}\left(3,-\left(c x+\sqrt{c^2 x^2+1}\right)^2\right)}{2 d^3}$$
$$+\frac{4 c^5 a b x^3 \sqrt{c^2 x^2+1}}{3 d^3 (c^4 x^4+2 c^2 x^2+1)}-\frac{3 c^4 a b x^2 \operatorname{arcsinh}(c x)}{d^3 (c^4 x^4+2 c^2 x^2+1)}+\frac{c^3 a b x \sqrt{c^2 x^2+1}}{2 d^3 (c^4 x^4+2 c^2 x^2+1)}-\frac{c a b \sqrt{c^2 x^2+1}}{d^3 (c^4 x^4+2 c^2 x^2+1) x}+\frac{4 c^5 b^2 x^3 \sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x)}{3 d^3 (c^4 x^4+2 c^2 x^2+1)}$$
$$+\frac{c^3 b^2 x \sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x)}{2 d^3 (c^4 x^4+2 c^2 x^2+1)}-\frac{c b^2 \sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x)}{d^3 (c^4 x^4+2 c^2 x^2+1) x}-\frac{4 c^6 a b x^4}{3 d^3 (c^4 x^4+2 c^2 x^2+1)}-\frac{8 c^4 a b x^2}{3 d^3 (c^4 x^4+2 c^2 x^2+1)}-\frac{a b \operatorname{arcsinh}(c x)}{d^3 (c^4 x^4+2 c^2 x^2+1) x^2}$$
$$-\frac{6 c^2 a b \operatorname{arcsinh}(c x) \ln\left(1+c x+\sqrt{c^2 x^2+1}\right)}{d^3}-\frac{6 c^2 a b \operatorname{arcsinh}(c x) \ln\left(1-c x-\sqrt{c^2 x^2+1}\right)}{d^3}-\frac{9 c^2 a b \operatorname{arcsinh}(c x)}{2 d^3 (c^4 x^4+2 c^2 x^2+1)}$$
$$+\frac{6 c^2 a b \operatorname{arcsinh}(c x) \ln\left(1+\left(c x+\sqrt{c^2 x^2+1}\right)^2\right)}{d^3}-\frac{4 c^6 b^2 x^4 \operatorname{arcsinh}(c x)}{3 d^3 (c^4 x^4+2 c^2 x^2+1)}-\frac{3 c^4 b^2 x^2 \operatorname{arcsinh}(c x)^2}{2 d^3 (c^4 x^4+2 c^2 x^2+1)}-\frac{8 c^4 b^2 x^2 \operatorname{arcsinh}(c x)}{3 d^3 (c^4 x^4+2 c^2 x^2+1)}$$

Problem 70: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 310 leaves, 14 steps):

$$-\frac{52 b^2 \sqrt{c^2 d x^2+d}}{225 c^4}-\frac{26 b^2 (c^2 x^2+1) \sqrt{c^2 d x^2+d}}{675 c^4}+\frac{2 b^2 (c^2 x^2+1)^2 \sqrt{c^2 d x^2+d}}{125 c^4}-\frac{2 (a+b \operatorname{arcsinh}(c x))^2 \sqrt{c^2 d x^2+d}}{15 c^4}$$
$$+\frac{x^2 (a+b \operatorname{arcsinh}(c x))^2 \sqrt{c^2 d x^2+d}}{15 c^2}+\frac{x^4 (a+b \operatorname{arcsinh}(c x))^2 \sqrt{c^2 d x^2+d}}{5}+\frac{4 a b x \sqrt{c^2 d x^2+d}}{15 c^3 \sqrt{c^2 x^2+1}}+\frac{4 b^2 x \operatorname{arcsinh}(c x) \sqrt{c^2 d x^2+d}}{15 c^3 \sqrt{c^2 x^2+1}}$$
$$-\frac{2 b x^3 (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{45 c \sqrt{c^2 x^2+1}}-\frac{2 b c x^5 (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{25 \sqrt{c^2 x^2+1}}$$

Result(type 3, 1161 leaves):

$$a^2 \left(\frac{x^2 (c^2 d x^2+d)^{3/2}}{5 c^2 d}-\frac{2 (c^2 d x^2+d)^{3/2}}{15 d c^4}\right)$$
$$+b^2 \left(\frac{1}{4000 (c^2 x^2+1) c^4} \left(\sqrt{d (c^2 x^2+1)} \left(16 x^6 c^6+16 \sqrt{c^2 x^2+1}\, x^5 c^5+28 c^4 x^4+20 c^3 x^3 \sqrt{c^2 x^2+1}+13 c^2 x^2+5 \sqrt{c^2 x^2+1}\, c x\right.\right.\right.$$
$$\left.\left.+1\right) (25 \operatorname{arcsinh}(c x)^2-10 \operatorname{arcsinh}(c x)+2)\right)$$

$$- \frac{\sqrt{d\left(c^2x^2+1\right)}\left(4c^4x^4+4c^3x^3\sqrt{c^2x^2+1}+5c^2x^2+3\sqrt{c^2x^2+1}\,cx+1\right)\left(9\operatorname{arcsinh}(cx)^2-6\operatorname{arcsinh}(cx)+2\right)}{864\left(c^2x^2+1\right)c^4}$$

$$- \frac{\sqrt{d\left(c^2x^2+1\right)}\left(c^2x^2+\sqrt{c^2x^2+1}\,cx+1\right)\left(\operatorname{arcsinh}(cx)^2-2\operatorname{arcsinh}(cx)+2\right)}{16\left(c^2x^2+1\right)c^4}$$

$$- \frac{\sqrt{d\left(c^2x^2+1\right)}\left(c^2x^2-\sqrt{c^2x^2+1}\,cx+1\right)\left(\operatorname{arcsinh}(cx)^2+2\operatorname{arcsinh}(cx)+2\right)}{16\left(c^2x^2+1\right)c^4}$$

$$- \frac{\sqrt{d\left(c^2x^2+1\right)}\left(4c^4x^4-4c^3x^3\sqrt{c^2x^2+1}+5c^2x^2-3\sqrt{c^2x^2+1}\,cx+1\right)\left(9\operatorname{arcsinh}(cx)^2+6\operatorname{arcsinh}(cx)+2\right)}{864\left(c^2x^2+1\right)c^4}$$

$$+ \frac{1}{4000\left(c^2x^2+1\right)c^4}\left(\sqrt{d\left(c^2x^2+1\right)}\left(16x^6c^6-16\sqrt{c^2x^2+1}\,x^5c^5+28c^4x^4-20c^3x^3\sqrt{c^2x^2+1}+13c^2x^2-5\sqrt{c^2x^2+1}\,cx\right.\right.$$

$$\left.\left.+1\right)\left(25\operatorname{arcsinh}(cx)^2+10\operatorname{arcsinh}(cx)+2\right)\right)\Bigg)$$

$$+2ab\left(\frac{\sqrt{d\left(c^2x^2+1\right)}\left(16x^6c^6+16\sqrt{c^2x^2+1}\,x^5c^5+28c^4x^4+20c^3x^3\sqrt{c^2x^2+1}+13c^2x^2+5\sqrt{c^2x^2+1}\,cx+1\right)\left(-1+5\operatorname{arcsinh}(cx)\right)}{800c^4\left(c^2x^2+1\right)}\right.$$

$$- \frac{\sqrt{d\left(c^2x^2+1\right)}\left(4c^4x^4+4c^3x^3\sqrt{c^2x^2+1}+5c^2x^2+3\sqrt{c^2x^2+1}\,cx+1\right)\left(-1+3\operatorname{arcsinh}(cx)\right)}{288c^4\left(c^2x^2+1\right)}$$

$$- \frac{\sqrt{d\left(c^2x^2+1\right)}\left(c^2x^2+\sqrt{c^2x^2+1}\,cx+1\right)\left(-1+\operatorname{arcsinh}(cx)\right)}{16c^4\left(c^2x^2+1\right)} - \frac{\sqrt{d\left(c^2x^2+1\right)}\left(c^2x^2-\sqrt{c^2x^2+1}\,cx+1\right)\left(1+\operatorname{arcsinh}(cx)\right)}{16c^4\left(c^2x^2+1\right)}$$

$$- \frac{\sqrt{d\left(c^2x^2+1\right)}\left(4c^4x^4-4c^3x^3\sqrt{c^2x^2+1}+5c^2x^2-3\sqrt{c^2x^2+1}\,cx+1\right)\left(1+3\operatorname{arcsinh}(cx)\right)}{288c^4\left(c^2x^2+1\right)}$$

$$\left.+ \frac{\sqrt{d\left(c^2x^2+1\right)}\left(16x^6c^6-16\sqrt{c^2x^2+1}\,x^5c^5+28c^4x^4-20c^3x^3\sqrt{c^2x^2+1}+13c^2x^2-5\sqrt{c^2x^2+1}\,cx+1\right)\left(1+5\operatorname{arcsinh}(cx)\right)}{800c^4\left(c^2x^2+1\right)}\right)$$

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Problem 71: Result more than twice size of optimal antiderivative.
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$$\int x^2\left(a+b\operatorname{arcsinh}(cx)\right)^2\sqrt{c^2dx^2+d}\,dx$$

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Optimal(type 3, 251 leaves, 10 steps):
```

$$\frac{b^2x\sqrt{c^2dx^2+d}}{64c^2}+\frac{b^2x^3\sqrt{c^2dx^2+d}}{32}+\frac{x\left(a+b\operatorname{arcsinh}(cx)\right)^2\sqrt{c^2dx^2+d}}{8c^2}+\frac{x^3\left(a+b\operatorname{arcsinh}(cx)\right)^2\sqrt{c^2dx^2+d}}{4}-\frac{b^2\operatorname{arcsinh}(cx)\sqrt{c^2dx^2+d}}{64c^3\sqrt{c^2x^2+1}}$$

$$-\frac{bx^2\left(a+b\operatorname{arcsinh}(cx)\right)\sqrt{c^2dx^2+d}}{8c\sqrt{c^2x^2+1}}-\frac{bcx^4\left(a+b\operatorname{arcsinh}(cx)\right)\sqrt{c^2dx^2+d}}{8\sqrt{c^2x^2+1}}-\frac{\left(a+b\operatorname{arcsinh}(cx)\right)^3\sqrt{c^2dx^2+d}}{24bc^3\sqrt{c^2x^2+1}}$$

```
Result(type 3, 700 leaves):
```

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

$$- \frac{b^2 \sqrt{d (c^2 x^2 + 1)}\, \operatorname{arcsinh}(c x)^3}{24 \sqrt{c^2 x^2 + 1}\, c^3} + \frac{b^2 \sqrt{d (c^2 x^2 + 1)}\, c^2 x^5}{32 (c^2 x^2 + 1)} + \frac{3 b^2 \sqrt{d (c^2 x^2 + 1)}\, x^3}{64 (c^2 x^2 + 1)} + \frac{b^2 \sqrt{d (c^2 x^2 + 1)}\, x}{64 c^2 (c^2 x^2 + 1)} + \frac{b^2 \sqrt{d (c^2 x^2 + 1)}\, c^2 \operatorname{arcsinh}(c x)^2 x^5}{4 (c^2 x^2 + 1)}$$

$$+ \frac{3 b^2 \sqrt{d (c^2 x^2 + 1)}\, \operatorname{arcsinh}(c x)^2 x^3}{8 (c^2 x^2 + 1)} + \frac{b^2 \sqrt{d (c^2 x^2 + 1)}\, x \operatorname{arcsinh}(c x)^2}{8 c^2 (c^2 x^2 + 1)} - \frac{b^2 \sqrt{d (c^2 x^2 + 1)}\, \operatorname{arcsinh}(c x)}{64 c^3 \sqrt{c^2 x^2 + 1}} - \frac{a b \sqrt{d (c^2 x^2 + 1)}\, \operatorname{arcsinh}(c x)^2}{8 \sqrt{c^2 x^2 + 1}\, c^3}$$

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

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

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Problem 72: Result more than twice size of optimal antiderivative.
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$$\int \frac{(a + b \operatorname{arcsinh}(c x))^2 \sqrt{c^2 d x^2 + d}}{x^3}\, dx$$

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Optimal(type 4, 371 leaves, 13 steps):
```

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

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

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

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

```
Result(type 4, 869 leaves):
```

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

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

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

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

$$+\frac{b^2\sqrt{d(c^2x^2+1)}\operatorname{polylog}\left(3, -cx-\sqrt{c^2x^2+1}\right)c^2}{\sqrt{c^2x^2+1}}-\frac{2b^2\sqrt{d(c^2x^2+1)}\arctan\!\mathrm{h}\left(cx+\sqrt{c^2x^2+1}\right)c^2}{\sqrt{c^2x^2+1}}-\frac{ab\sqrt{d(c^2x^2+1)}\,\operatorname{arcsinh}(cx)\,c^2}{c^2x^2+1}$$

$$-\frac{ab\sqrt{d(c^2x^2+1)}\,c}{x\sqrt{c^2x^2+1}}-\frac{ab\operatorname{arcsinh}(cx)\sqrt{d(c^2x^2+1)}}{x^2(c^2x^2+1)}-\frac{ab\sqrt{d(c^2x^2+1)}\,\operatorname{arcsinh}(cx)\ln\left(1+cx+\sqrt{c^2x^2+1}\right)c^2}{\sqrt{c^2x^2+1}}$$

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

$$+\frac{ab\sqrt{d(c^2x^2+1)}\operatorname{polylog}\left(2, cx+\sqrt{c^2x^2+1}\right)c^2}{\sqrt{c^2x^2+1}}$$

Problem 73: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 351 leaves, 17 steps):

$$\frac{x^3\left(c^2dx^2+d\right)^{3/2}(a+b\operatorname{arcsinh}(cx))^2}{6}-\frac{7b^2dx\sqrt{c^2dx^2+d}}{1152c^2}+\frac{43b^2dx^3\sqrt{c^2dx^2+d}}{1728}+\frac{b^2c^2dx^5\sqrt{c^2dx^2+d}}{108}$$

$$+\frac{dx(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2dx^2+d}}{16c^2}+\frac{dx^3(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2dx^2+d}}{8}+\frac{7b^2d\operatorname{arcsinh}(cx)\sqrt{c^2dx^2+d}}{1152c^3\sqrt{c^2x^2+1}}$$

$$-\frac{bdx^2(a+b\operatorname{arcsinh}(cx))\sqrt{c^2dx^2+d}}{16c\sqrt{c^2x^2+1}}-\frac{7bcdx^4(a+b\operatorname{arcsinh}(cx))\sqrt{c^2dx^2+d}}{48\sqrt{c^2x^2+1}}-\frac{bc^3dx^6(a+b\operatorname{arcsinh}(cx))\sqrt{c^2dx^2+d}}{18\sqrt{c^2x^2+1}}$$

$$-\frac{d(a+b\operatorname{arcsinh}(cx))^3\sqrt{c^2dx^2+d}}{48bc^3\sqrt{c^2x^2+1}}$$

Result(type 3, 933 leaves):

$$\frac{ab\sqrt{d(c^2x^2+1)}\,dc^4\operatorname{arcsinh}(cx)\,x^7}{3(c^2x^2+1)}+\frac{65b^2\sqrt{d(c^2x^2+1)}\,dx^3}{3456(c^2x^2+1)}+\frac{a^2x\left(c^2dx^2+d\right)^{5/2}}{6c^2d}-\frac{a^2dx\sqrt{c^2dx^2+d}}{16c^2}-\frac{a^2d^2\ln\left(\frac{xc^2d}{\sqrt{c^2d}}+\sqrt{c^2dx^2+d}\right)}{16c^2\sqrt{c^2d}}$$

$$+\frac{11 a b \sqrt{d (c^2 x^2+1)}\, d c^2 \operatorname{arcsinh}(c x) x^5}{12 (c^2 x^2+1)}+\frac{a b \sqrt{d (c^2 x^2+1)}\, d \operatorname{arcsinh}(c x) x}{8 c^2 (c^2 x^2+1)}+\frac{b^2 \sqrt{d (c^2 x^2+1)}\, d c^4 x^7}{108 (c^2 x^2+1)}+\frac{59 b^2 \sqrt{d (c^2 x^2+1)}\, d c^2 x^5}{1728 (c^2 x^2+1)}$$
$$-\frac{7 b^2 \sqrt{d (c^2 x^2+1)}\, d x}{1152 c^2 (c^2 x^2+1)}-\frac{b^2 \sqrt{d (c^2 x^2+1)}\, \operatorname{arcsinh}(c x)^3 d}{48 \sqrt{c^2 x^2+1}\, c^3}+\frac{17 b^2 \sqrt{d (c^2 x^2+1)}\, d \operatorname{arcsinh}(c x)^2 x^3}{48 (c^2 x^2+1)}+\frac{7 b^2 \sqrt{d (c^2 x^2+1)}\, d \operatorname{arcsinh}(c x)}{1152 c^3 \sqrt{c^2 x^2+1}}$$
$$+\frac{7 a b \sqrt{d (c^2 x^2+1)}\, d}{1152 c^3 \sqrt{c^2 x^2+1}}-\frac{a^2 x (c^2 d x^2+d)^{3/2}}{24 c^2}-\frac{b^2 \sqrt{d (c^2 x^2+1)}\, d c^3 \operatorname{arcsinh}(c x) x^6}{18 \sqrt{c^2 x^2+1}}-\frac{7 b^2 \sqrt{d (c^2 x^2+1)}\, d c \operatorname{arcsinh}(c x) x^4}{48 \sqrt{c^2 x^2+1}}$$
$$-\frac{b^2 \sqrt{d (c^2 x^2+1)}\, d \operatorname{arcsinh}(c x) x^2}{16 c \sqrt{c^2 x^2+1}}-\frac{a b \sqrt{d (c^2 x^2+1)}\, d c^3 x^6}{18 \sqrt{c^2 x^2+1}}-\frac{7 a b \sqrt{d (c^2 x^2+1)}\, d c x^4}{48 \sqrt{c^2 x^2+1}}-\frac{a b \sqrt{d (c^2 x^2+1)}\, d x^2}{16 c \sqrt{c^2 x^2+1}}$$
$$+\frac{17 a b \sqrt{d (c^2 x^2+1)}\, d \operatorname{arcsinh}(c x) x^3}{24 (c^2 x^2+1)}-\frac{a b \sqrt{d (c^2 x^2+1)}\, \operatorname{arcsinh}(c x)^2 d}{16 \sqrt{c^2 x^2+1}\, c^3}+\frac{11 b^2 \sqrt{d (c^2 x^2+1)}\, d c^2 \operatorname{arcsinh}(c x)^2 x^5}{24 (c^2 x^2+1)}$$
$$+\frac{b^2 \sqrt{d (c^2 x^2+1)}\, d x \operatorname{arcsinh}(c x)^2}{16 c^2 (c^2 x^2+1)}+\frac{b^2 \sqrt{d (c^2 x^2+1)}\, d c^4 \operatorname{arcsinh}(c x)^2 x^7}{6 (c^2 x^2+1)}$$

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Problem 74: Result more than twice size of optimal antiderivative.
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$$\int \frac{(c^2 d x^2+d)^{5/2} (a+b \operatorname{arcsinh}(c x))^2}{x}\, dx$$

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Optimal(type 4, 614 leaves, 23 steps):
```

$$\frac{d (c^2 d x^2+d)^{3/2} (a+b \operatorname{arcsinh}(c x))^2}{3}+\frac{(c^2 d x^2+d)^{5/2} (a+b \operatorname{arcsinh}(c x))^2}{5}+\frac{598 b^2 d^2 \sqrt{c^2 d x^2+d}}{225}+\frac{74 b^2 d^2 (c^2 x^2+1) \sqrt{c^2 d x^2+d}}{675}$$
$$+\frac{2 b^2 d^2 (c^2 x^2+1)^2 \sqrt{c^2 d x^2+d}}{125}+d^2 (a+b \operatorname{arcsinh}(c x))^2 \sqrt{c^2 d x^2+d}-\frac{2 a b c d^2 x \sqrt{c^2 d x^2+d}}{\sqrt{c^2 x^2+1}}-\frac{2 b^2 c d^2 x \operatorname{arcsinh}(c x) \sqrt{c^2 d x^2+d}}{\sqrt{c^2 x^2+1}}$$
$$-\frac{16 b c d^2 x (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{15 \sqrt{c^2 x^2+1}}-\frac{22 b c^3 d^2 x^3 (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{45 \sqrt{c^2 x^2+1}}-\frac{2 b c^5 d^2 x^5 (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{25 \sqrt{c^2 x^2+1}}$$
$$-\frac{2 d^2 (a+b \operatorname{arcsinh}(c x))^2 \operatorname{arctanh}\left(c x+\sqrt{c^2 x^2+1}\right) \sqrt{c^2 d x^2+d}}{\sqrt{c^2 x^2+1}}-\frac{2 b d^2 (a+b \operatorname{arcsinh}(c x)) \operatorname{polylog}\left(2, -c x-\sqrt{c^2 x^2+1}\right) \sqrt{c^2 d x^2+d}}{\sqrt{c^2 x^2+1}}$$
$$+\frac{2 b d^2 (a+b \operatorname{arcsinh}(c x)) \operatorname{polylog}\left(2, c x+\sqrt{c^2 x^2+1}\right) \sqrt{c^2 d x^2+d}}{\sqrt{c^2 x^2+1}}+\frac{2 b^2 d^2 \operatorname{polylog}\left(3, -c x-\sqrt{c^2 x^2+1}\right) \sqrt{c^2 d x^2+d}}{\sqrt{c^2 x^2+1}}$$
$$-\frac{2 b^2 d^2 \operatorname{polylog}\left(3, c x+\sqrt{c^2 x^2+1}\right) \sqrt{c^2 d x^2+d}}{\sqrt{c^2 x^2+1}}$$

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Result(type 4, 1320 leaves):
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$$\frac{23 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x)^2}{15 (c^2 x^2+1)}+\frac{2 b^2 \sqrt{d (c^2 x^2+1)}\, \operatorname{polylog}\left(3,-c x-\sqrt{c^2 x^2+1}\right) d^2}{\sqrt{c^2 x^2+1}}-\frac{2 b^2 \sqrt{d (c^2 x^2+1)}\, \operatorname{polylog}\left(3, c x+\sqrt{c^2 x^2+1}\right) d^2}{\sqrt{c^2 x^2+1}}$$

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

$$+\frac{b^2 \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x)^2 x^6 c^6}{5 (c^2 x^2+1)}+\frac{14 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x)^2 x^4 c^4}{15 (c^2 x^2+1)}+\frac{34 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x)^2 x^2 c^2}{15 (c^2 x^2+1)}$$

$$-\frac{46 a b \sqrt{d (c^2 x^2+1)}\, d^2 c x}{15 \sqrt{c^2 x^2+1}}-\frac{2 a b \sqrt{d (c^2 x^2+1)}\, d^2 x^5 c^5}{25 \sqrt{c^2 x^2+1}}-\frac{22 a b \sqrt{d (c^2 x^2+1)}\, d^2 x^3 c^3}{45 \sqrt{c^2 x^2+1}}-\frac{2 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x) x^5 c^5}{25 \sqrt{c^2 x^2+1}}$$

$$-\frac{22 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x) x^3 c^3}{45 \sqrt{c^2 x^2+1}}-\frac{46 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x) x c}{15 \sqrt{c^2 x^2+1}}+\frac{9394 b^2 \sqrt{d (c^2 x^2+1)}\, d^2}{3375 (c^2 x^2+1)}+\frac{a^2 d (c^2 d x^2+d)^{3/2}}{3}$$

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

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

$$-\frac{2 b^2 \sqrt{d (c^2 x^2+1)}\, \operatorname{arcsinh}(c x) \operatorname{polylog}\left(2,-c x-\sqrt{c^2 x^2+1}\right) d^2}{\sqrt{c^2 x^2+1}}+\frac{2 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 x^6 c^6}{125 (c^2 x^2+1)}+\frac{532 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 x^4 c^4}{3375 (c^2 x^2+1)}$$

$$+\frac{9872 b^2 \sqrt{d (c^2 x^2+1)}\, d^2 c^2 x^2}{3375 (c^2 x^2+1)}+\frac{2 a b \sqrt{d (c^2 x^2+1)}\, \operatorname{polylog}\left(2, c x+\sqrt{c^2 x^2+1}\right) d^2}{\sqrt{c^2 x^2+1}}-\frac{2 a b \sqrt{d (c^2 x^2+1)}\, \operatorname{polylog}\left(2,-c x-\sqrt{c^2 x^2+1}\right) d^2}{\sqrt{c^2 x^2+1}}$$

$$+\frac{46 a b \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x)}{15 (c^2 x^2+1)}+\frac{28 a b \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x) x^4 c^4}{15 (c^2 x^2+1)}+\frac{68 a b \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x) x^2 c^2}{15 (c^2 x^2+1)}$$

$$+\frac{2 a b \sqrt{d (c^2 x^2+1)}\, d^2 \operatorname{arcsinh}(c x) x^6 c^6}{5 (c^2 x^2+1)}+\frac{(c^2 d x^2+d)^{5/2} a^2}{5}$$

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Problem 75: Result more than twice size of optimal antiderivative.
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$$\int \frac{(c^2 d x^2+d)^{5/2} (a+b \operatorname{arcsinh}(c x))^2}{x^4}\, dx$$

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Optimal(type 4, 511 leaves, 27 steps):
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$$-\frac{5 c^2 d (c^2 d x^2+d)^{3/2} (a+b \operatorname{arcsinh}(c x))^2}{3 x}-\frac{(c^2 d x^2+d)^{5/2} (a+b \operatorname{arcsinh}(c x))^2}{3 x^3}+\frac{7 b^2 c^4 d^2 x \sqrt{c^2 d x^2+d}}{12}-\frac{b^2 c^2 d^2 (c^2 x^2+1) \sqrt{c^2 d x^2+d}}{3 x}$$

$$-\frac{b c d^2 (c^2 x^2+1)^{3/2} (a+b\,\mathrm{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{3 x^2}+\frac{5 c^4 d^2 x (a+b\,\mathrm{arcsinh}(c x))^2 \sqrt{c^2 d x^2+d}}{2}-\frac{23 b^2 c^3 d^2 \mathrm{arcsinh}(c x) \sqrt{c^2 d x^2+d}}{12 \sqrt{c^2 x^2+1}}$$

$$-\frac{5 b c^5 d^2 x^2 (a+b\,\mathrm{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{2 \sqrt{c^2 x^2+1}}+\frac{7 c^3 d^2 (a+b\,\mathrm{arcsinh}(c x))^2 \sqrt{c^2 d x^2+d}}{3 \sqrt{c^2 x^2+1}}+\frac{5 c^3 d^2 (a+b\,\mathrm{arcsinh}(c x))^3 \sqrt{c^2 d x^2+d}}{6 b \sqrt{c^2 x^2+1}}$$

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

$$+\frac{7 b c^3 d^2 (a+b\,\mathrm{arcsinh}(c x)) \sqrt{c^2 x^2+1} \sqrt{c^2 d x^2+d}}{3}$$

Result(type ?, 3310 leaves): Display of huge result suppressed!

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

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

Optimal(type 3, 41 leaves, 1 step):

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

Result(type 3, 119 leaves):

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

Problem 80: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 281 leaves, 9 steps):

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

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

$$-\frac{(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2dx^2+d}}{3dx^3}+\frac{2c^2(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2dx^2+d}}{3dx}$$

Result(type ?, 2146 leaves): Display of huge result suppressed!

Problem 82: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b\operatorname{arcsinh}(cx))^2}{x^4\left(c^2dx^2+d\right)^{3/2}}\,dx$$

Optimal(type 4, 438 leaves, 24 steps):

$$-\frac{b^2c^2\left(c^2x^2+1\right)}{3dx\sqrt{c^2dx^2+d}}-\frac{(a+b\operatorname{arcsinh}(cx))^2}{3dx^3\sqrt{c^2dx^2+d}}+\frac{4c^2(a+b\operatorname{arcsinh}(cx))^2}{3dx\sqrt{c^2dx^2+d}}+\frac{8c^4x(a+b\operatorname{arcsinh}(cx))^2}{3d\sqrt{c^2dx^2+d}}-\frac{bc(a+b\operatorname{arcsinh}(cx))\sqrt{c^2x^2+1}}{3dx^2\sqrt{c^2dx^2+d}}$$
$$+\frac{8c^3(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2x^2+1}}{3d\sqrt{c^2dx^2+d}}+\frac{20bc^3(a+b\operatorname{arcsinh}(cx))\operatorname{arctanh}\left(\left(cx+\sqrt{c^2x^2+1}\right)^2\right)\sqrt{c^2x^2+1}}{3d\sqrt{c^2dx^2+d}}$$
$$-\frac{16bc^3(a+b\operatorname{arcsinh}(cx))\ln\left(1+\left(cx+\sqrt{c^2x^2+1}\right)^2\right)\sqrt{c^2x^2+1}}{3d\sqrt{c^2dx^2+d}}-\frac{b^2c^3\operatorname{polylog}\left(2,-\left(cx+\sqrt{c^2x^2+1}\right)^2\right)\sqrt{c^2x^2+1}}{d\sqrt{c^2dx^2+d}}$$
$$-\frac{5b^2c^3\operatorname{polylog}\left(2,\left(cx+\sqrt{c^2x^2+1}\right)^2\right)\sqrt{c^2x^2+1}}{3d\sqrt{c^2dx^2+d}}$$

Result(type ?, 2608 leaves): Display of huge result suppressed!

Problem 83: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 294 leaves, 16 steps):

$$-\frac{x^2(a+b\operatorname{arcsinh}(cx))^2}{3c^2d\left(c^2dx^2+d\right)^{3/2}}-\frac{b^2}{3c^4d^2\sqrt{c^2dx^2+d}}-\frac{2(a+b\operatorname{arcsinh}(cx))^2}{3c^4d^2\sqrt{c^2dx^2+d}}-\frac{bx(a+b\operatorname{arcsinh}(cx))}{3c^3d^2\sqrt{c^2x^2+1}\sqrt{c^2dx^2+d}}$$
$$+\frac{10b(a+b\operatorname{arcsinh}(cx))\arctan\left(cx+\sqrt{c^2x^2+1}\right)\sqrt{c^2x^2+1}}{3c^4d^2\sqrt{c^2dx^2+d}}-\frac{5Ib^2\operatorname{polylog}\left(2,-I\left(cx+\sqrt{c^2x^2+1}\right)\right)\sqrt{c^2x^2+1}}{3c^4d^2\sqrt{c^2dx^2+d}}$$
$$+\frac{5Ib^2\operatorname{polylog}\left(2,I\left(cx+\sqrt{c^2x^2+1}\right)\right)\sqrt{c^2x^2+1}}{3c^4d^2\sqrt{c^2dx^2+d}}$$

Result(type 4, 704 leaves):

$$-\frac{a^2x^2}{c^2d\left(c^2dx^2+d\right)^{3/2}}-\frac{2a^2}{3dc^4\left(c^2dx^2+d\right)^{3/2}}-\frac{b^2\sqrt{d\left(c^2x^2+1\right)}\operatorname{arcsinh}(cx)^2x^2}{\left(c^2x^2+1\right)^2d^3c^2}-\frac{b^2\sqrt{d\left(c^2x^2+1\right)}\operatorname{arcsinh}(cx)x}{3\left(c^2x^2+1\right)^{3/2}d^3c^3}-\frac{b^2\sqrt{d\left(c^2x^2+1\right)}x^2}{3\left(c^2x^2+1\right)^2d^3c^2}$$

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

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

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

$$- \frac{4 a b \sqrt{d (c^2 x^2+1)}\, \mathrm{arcsinh}(c x)}{3 (c^2 x^2+1)^2 d^3 c^4} - \frac{5 \mathrm{I} a b \sqrt{d (c^2 x^2+1)} \ln\left(c x+\sqrt{c^2 x^2+1}-\mathrm{I}\right)}{3 \sqrt{c^2 x^2+1}\, c^4 d^3} - \frac{5 \mathrm{I} b^2 \sqrt{d (c^2 x^2+1)}\, \mathrm{dilog}\left(1 + \mathrm{I} \left(c x+\sqrt{c^2 x^2+1}\right)\right)}{3 \sqrt{c^2 x^2+1}\, c^4 d^3}$$

Problem 84: Unable to integrate problem.

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

Optimal(type 4, 534 leaves, 24 steps):

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

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

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

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

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

Result(type 8, 28 leaves):

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

Problem 87: Unable to integrate problem.

$$\int \frac{\mathrm{arcsinh}(a x)^3}{(a^2 c x^2+c)^2}\, dx$$

Optimal(type 4, 358 leaves, 18 steps):

$$\frac{x\operatorname{arcsinh}(a x)^3}{2 c^2 (a^2 x^2+1)} - \frac{6\operatorname{arcsinh}(a x)\arctan\left(a x+\sqrt{a^2 x^2+1}\right)}{a c^2} + \frac{\operatorname{arcsinh}(a x)^3\arctan\left(a x+\sqrt{a^2 x^2+1}\right)}{a c^2} + \frac{3 I \operatorname{polylog}\left(2, -I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{a c^2} - \frac{3 I\operatorname{arcsinh}(a x)^2\operatorname{polylog}\left(2, -I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{2 a c^2} - \frac{3 I \operatorname{polylog}\left(2, I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{a c^2} + \frac{3 I\operatorname{arcsinh}(a x)^2\operatorname{polylog}\left(2, I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{2 a c^2} + \frac{3 I\operatorname{arcsinh}(a x)\operatorname{polylog}\left(3, -I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{a c^2} - \frac{3 I\operatorname{arcsinh}(a x)\operatorname{polylog}\left(3, I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{a c^2} - \frac{3 I \operatorname{polylog}\left(4, -I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{a c^2} + \frac{3 I \operatorname{polylog}\left(4, I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{a c^2} + \frac{3\operatorname{arcsinh}(a x)^2}{2 a c^2\sqrt{a^2 x^2+1}}$$

Result(type 8, 21 leaves):

$$\int \frac{\operatorname{arcsinh}(a x)^3}{(a^2 c x^2+c)^2}\, dx$$

Problem 88: Unable to integrate problem.

$$\int \frac{\operatorname{arcsinh}(a x)^3}{(a^2 c x^2+c)^3}\, dx$$

Optimal(type 4, 447 leaves, 28 steps):

$$-\frac{x\operatorname{arcsinh}(a x)}{4 c^3 (a^2 x^2+1)} + \frac{\operatorname{arcsinh}(a x)^2}{4 a c^3 (a^2 x^2+1)^{3/2}} + \frac{x\operatorname{arcsinh}(a x)^3}{4 c^3 (a^2 x^2+1)^2} + \frac{3 x\operatorname{arcsinh}(a x)^3}{8 c^3 (a^2 x^2+1)} - \frac{5\operatorname{arcsinh}(a x)\arctan\left(a x+\sqrt{a^2 x^2+1}\right)}{a c^3} + \frac{3\operatorname{arcsinh}(a x)^3\arctan\left(a x+\sqrt{a^2 x^2+1}\right)}{4 a c^3} - \frac{9 I\operatorname{arcsinh}(a x)^2\operatorname{polylog}\left(2, -I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{8 a c^3} - \frac{5 I \operatorname{polylog}\left(2, I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{2 a c^3} - \frac{9 I\operatorname{arcsinh}(a x)\operatorname{polylog}\left(3, I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{4 a c^3} + \frac{9 I\operatorname{arcsinh}(a x)^2\operatorname{polylog}\left(2, I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{8 a c^3} + \frac{9 I\operatorname{arcsinh}(a x)\operatorname{polylog}\left(3, -I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{4 a c^3} + \frac{5 I \operatorname{polylog}\left(2, -I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{2 a c^3} - \frac{9 I \operatorname{polylog}\left(4, -I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{4 a c^3} + \frac{9 I \operatorname{polylog}\left(4, I\left(a x+\sqrt{a^2 x^2+1}\right)\right)}{4 a c^3} - \frac{1}{4 a c^3\sqrt{a^2 x^2+1}} + \frac{9\operatorname{arcsinh}(a x)^2}{8 a c^3\sqrt{a^2 x^2+1}}$$

Result(type 8, 21 leaves):

$$\int \frac{\operatorname{arcsinh}(a x)^3}{(a^2 c x^2+c)^3}\, dx$$

Problem 112: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 145 leaves, 10 steps):

$$-\frac{(c^2 x^2+1)^2}{b c (a+b \operatorname{arcsinh}(c x))} + \frac{\cosh\left(\frac{2 a}{b}\right) \operatorname{Shi}\left(\frac{2 (a+b \operatorname{arcsinh}(c x))}{b}\right)}{b^2 c} + \frac{\cosh\left(\frac{4 a}{b}\right) \operatorname{Shi}\left(\frac{4 (a+b \operatorname{arcsinh}(c x))}{b}\right)}{2 b^2 c} - \frac{\operatorname{Chi}\left(\frac{2 (a+b \operatorname{arcsinh}(c x))}{b}\right) \sinh\left(\frac{2 a}{b}\right)}{b^2 c} - \frac{\operatorname{Chi}\left(\frac{4 (a+b \operatorname{arcsinh}(c x))}{b}\right) \sinh\left(\frac{4 a}{b}\right)}{2 b^2 c}$$

Result(type 4, 419 leaves):

$$-\frac{3}{8 c b (a+b \operatorname{arcsinh}(c x))} - \frac{8 c^4 x^4 - 8 c^3 x^3 \sqrt{c^2 x^2+1} + 8 c^2 x^2 - 4 \sqrt{c^2 x^2+1}\, c x + 1}{16 c b (a+b \operatorname{arcsinh}(c x))} + \frac{e^{\frac{4 a}{b}} \operatorname{Ei}_1\left(4 \operatorname{arcsinh}(c x) + \frac{4 a}{b}\right)}{4 c b^2} - \frac{2 c^2 x^2 - 2 \sqrt{c^2 x^2+1}\, c x + 1}{4 c b (a+b \operatorname{arcsinh}(c x))} + \frac{e^{\frac{2 a}{b}} \operatorname{Ei}_1\left(2 \operatorname{arcsinh}(c x) + \frac{2 a}{b}\right)}{2 c b^2} - \frac{2 b c^2 x^2 + 2 b c \sqrt{c^2 x^2+1}\, x + 2 \operatorname{Ei}_1\left(-2 \operatorname{arcsinh}(c x) - \frac{2 a}{b}\right) e^{-\frac{2 a}{b}} \operatorname{arcsinh}(c x)\, b + 2 \operatorname{Ei}_1\left(-2 \operatorname{arcsinh}(c x) - \frac{2 a}{b}\right) e^{-\frac{2 a}{b}} a + b}{4 c b^2 (a+b \operatorname{arcsinh}(c x))} - \frac{1}{16 c b^2 (a+b \operatorname{arcsinh}(c x))} \left(8 x^4 b c^4 + 8 \sqrt{c^2 x^2+1}\, x^3 b c^3 + 8 b c^2 x^2 + 4 b c \sqrt{c^2 x^2+1}\, x + 4 e^{-\frac{4 a}{b}} \operatorname{arcsinh}(c x) \operatorname{Ei}_1\left(-4 \operatorname{arcsinh}(c x) - \frac{4 a}{b}\right) b + 4 e^{-\frac{4 a}{b}} \operatorname{Ei}_1\left(-4 \operatorname{arcsinh}(c x) - \frac{4 a}{b}\right) a + b\right)$$

Problem 114: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 204 leaves, 13 steps):

$$-\frac{(c^2 x^2+1)^3}{b c (a+b \operatorname{arcsinh}(c x))} + \frac{15 \cosh\left(\frac{2 a}{b}\right) \operatorname{Shi}\left(\frac{2 (a+b \operatorname{arcsinh}(c x))}{b}\right)}{16 b^2 c} + \frac{3 \cosh\left(\frac{4 a}{b}\right) \operatorname{Shi}\left(\frac{4 (a+b \operatorname{arcsinh}(c x))}{b}\right)}{4 b^2 c} + \frac{3 \cosh\left(\frac{6 a}{b}\right) \operatorname{Shi}\left(\frac{6 (a+b \operatorname{arcsinh}(c x))}{b}\right)}{16 b^2 c} - \frac{15 \operatorname{Chi}\left(\frac{2 (a+b \operatorname{arcsinh}(c x))}{b}\right) \sinh\left(\frac{2 a}{b}\right)}{16 b^2 c} - \frac{3 \operatorname{Chi}\left(\frac{4 (a+b \operatorname{arcsinh}(c x))}{b}\right) \sinh\left(\frac{4 a}{b}\right)}{4 b^2 c}$$

$$-\frac{3\,\mathrm{Chi}\left(\frac{6\,(a+b\,\mathrm{arcsinh}(c\,x))}{b}\right)\sinh\left(\frac{6\,a}{b}\right)}{16\,b^2\,c}$$

Result(type 4, 703 leaves):

$$-\frac{5}{16\,c\,b\,(a+b\,\mathrm{arcsinh}(c\,x))}-\frac{32\,x^6\,c^6-32\sqrt{c^2\,x^2+1}\;x^5\,c^5+48\,c^4\,x^4-32\,c^3\,x^3\sqrt{c^2\,x^2+1}\;+18\,c^2\,x^2-6\sqrt{c^2\,x^2+1}\;c\,x+1}{64\,c\,b\,(a+b\,\mathrm{arcsinh}(c\,x))}$$
$$+\frac{3\,\mathrm{e}^{\frac{6\,a}{b}}\;\mathrm{Ei}_1\left(6\,\mathrm{arcsinh}(c\,x)\;+\frac{6\,a}{b}\right)}{32\,c\,b^2}-\frac{3\left(8\,c^4\,x^4-8\,c^3\,x^3\sqrt{c^2\,x^2+1}\;+8\,c^2\,x^2-4\sqrt{c^2\,x^2+1}\;c\,x+1\right)}{32\,c\,b\,(a+b\,\mathrm{arcsinh}(c\,x))}+\frac{3\,\mathrm{e}^{\frac{4\,a}{b}}\;\mathrm{Ei}_1\left(4\,\mathrm{arcsinh}(c\,x)\;+\frac{4\,a}{b}\right)}{8\,c\,b^2}$$
$$-\frac{15\left(2\,c^2\,x^2-2\sqrt{c^2\,x^2+1}\;c\,x+1\right)}{64\,c\,b\,(a+b\,\mathrm{arcsinh}(c\,x))}+\frac{15\,\mathrm{e}^{\frac{2\,a}{b}}\;\mathrm{Ei}_1\left(2\,\mathrm{arcsinh}(c\,x)\;+\frac{2\,a}{b}\right)}{32\,c\,b^2}$$
$$-\frac{15\left(2\,b\,c^2\,x^2+2\,b\,c\sqrt{c^2\,x^2+1}\;x+2\,\mathrm{Ei}_1\left(-2\,\mathrm{arcsinh}(c\,x)-\frac{2\,a}{b}\right)\mathrm{e}^{-\frac{2\,a}{b}}\;\mathrm{arcsinh}(c\,x)\;b+2\,\mathrm{Ei}_1\left(-2\,\mathrm{arcsinh}(c\,x)-\frac{2\,a}{b}\right)\mathrm{e}^{-\frac{2\,a}{b}}\;a+b\right)}{64\,c\,b^2\,(a+b\,\mathrm{arcsinh}(c\,x))}$$
$$-\frac{1}{32\,c\,b^2\,(a+b\,\mathrm{arcsinh}(c\,x))}\left(3\left(8\,x^4\,b\,c^4+8\sqrt{c^2\,x^2+1}\;x^3\,b\,c^3+8\,b\,c^2\,x^2+4\,b\,c\sqrt{c^2\,x^2+1}\;x+4\,\mathrm{e}^{-\frac{4\,a}{b}}\;\mathrm{arcsinh}(c\,x)\;\mathrm{Ei}_1\left(-4\,\mathrm{arcsinh}(c\,x)-\frac{4\,a}{b}\right)b\right.\right.$$
$$\left.\left.+4\,\mathrm{e}^{-\frac{4\,a}{b}}\;\mathrm{Ei}_1\left(-4\,\mathrm{arcsinh}(c\,x)-\frac{4\,a}{b}\right)a+b\right)\right)-\frac{1}{64\,c\,b^2\,(a+b\,\mathrm{arcsinh}(c\,x))}\left(32\,x^6\,b\,c^6+32\sqrt{c^2\,x^2+1}\;x^5\,b\,c^5+48\,x^4\,b\,c^4+32\sqrt{c^2\,x^2+1}\;x^3\,b\,c^3\right.$$
$$\left.+18\,b\,c^2\,x^2+6\,b\,c\sqrt{c^2\,x^2+1}\;x+6\,\mathrm{arcsinh}(c\,x)\;\mathrm{Ei}_1\left(-6\,\mathrm{arcsinh}(c\,x)-\frac{6\,a}{b}\right)\mathrm{e}^{-\frac{6\,a}{b}}\;b+6\,\mathrm{Ei}_1\left(-6\,\mathrm{arcsinh}(c\,x)-\frac{6\,a}{b}\right)\mathrm{e}^{-\frac{6\,a}{b}}\;a+b\right)$$

Problem 117: Result more than twice size of optimal antiderivative.

$$\int\frac{x^4}{(a+b\,\mathrm{arcsinh}(c\,x))^2\sqrt{c^2\,x^2+1}}\,\mathrm{d}x$$

Optimal(type 4, 137 leaves, 10 steps):

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

Result(type 4, 419 leaves):

$$-\frac{3}{8 c^5 b (a+b \operatorname{arcsinh}(c x))}-\frac{8 c^4 x^4-8 c^3 x^3 \sqrt{c^2 x^2+1}+8 c^2 x^2-4 \sqrt{c^2 x^2+1}\, c x+1}{16 c^5 b (a+b \operatorname{arcsinh}(c x))}+\frac{e^{\frac{4 a}{b}} \operatorname{Ei}_1\left(4 \operatorname{arcsinh}(c x)+\frac{4 a}{b}\right)}{4 c^5 b^2}$$
$$+\frac{2 c^2 x^2-2 \sqrt{c^2 x^2+1}\, c x+1}{4 c^5 b (a+b \operatorname{arcsinh}(c x))}-\frac{e^{\frac{2 a}{b}} \operatorname{Ei}_1\left(2 \operatorname{arcsinh}(c x)+\frac{2 a}{b}\right)}{2 c^5 b^2}$$
$$+\frac{2 b c^2 x^2+2 b c \sqrt{c^2 x^2+1}\, x+2 \operatorname{Ei}_1\left(-2 \operatorname{arcsinh}(c x)-\frac{2 a}{b}\right) e^{-\frac{2 a}{b}} \operatorname{arcsinh}(c x)\, b+2 \operatorname{Ei}_1\left(-2 \operatorname{arcsinh}(c x)-\frac{2 a}{b}\right) e^{-\frac{2 a}{b}} a+b}{4 c^5 b^2 (a+b \operatorname{arcsinh}(c x))}$$
$$-\frac{1}{16 c^5 b^2 (a+b \operatorname{arcsinh}(c x))}\left(8 x^4 b c^4+8 \sqrt{c^2 x^2+1}\, x^3 b c^3+8 b c^2 x^2+4 b c \sqrt{c^2 x^2+1}\, x+4 e^{-\frac{4 a}{b}} \operatorname{arcsinh}(c x) \operatorname{Ei}_1\left(-4 \operatorname{arcsinh}(c x)-\frac{4 a}{b}\right) b\right.$$
$$\left.+4 e^{-\frac{4 a}{b}} \operatorname{Ei}_1\left(-4 \operatorname{arcsinh}(c x)-\frac{4 a}{b}\right) a+b\right)$$

Problem 118: Result more than twice size of optimal antiderivative.

$$\int \frac{x^3}{(a+b \operatorname{arcsinh}(c x))^2 \sqrt{c^2 x^2+1}}\, dx$$

Optimal(type 4, 134 leaves, 10 steps):

$$-\frac{x^3}{b c (a+b \operatorname{arcsinh}(c x))}-\frac{3 \operatorname{Chi}\left(\frac{a+b \operatorname{arcsinh}(c x)}{b}\right) \cosh\left(\frac{a}{b}\right)}{4 b^2 c^4}+\frac{3 \operatorname{Chi}\left(\frac{3 (a+b \operatorname{arcsinh}(c x))}{b}\right) \cosh\left(\frac{3 a}{b}\right)}{4 b^2 c^4}+\frac{3 \operatorname{Shi}\left(\frac{a+b \operatorname{arcsinh}(c x)}{b}\right) \sinh\left(\frac{a}{b}\right)}{4 b^2 c^4}$$
$$-\frac{3 \operatorname{Shi}\left(\frac{3 (a+b \operatorname{arcsinh}(c x))}{b}\right) \sinh\left(\frac{3 a}{b}\right)}{4 b^2 c^4}$$

Result(type 4, 363 leaves):

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

Problem 119: Result more than twice size of optimal antiderivative.

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

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

$$-\frac{x}{b c\,(a+b\,\mathrm{arcsinh}(c x))}+\frac{\mathrm{Chi}\left(\frac{a+b\,\mathrm{arcsinh}(c x)}{b}\right)\cosh\left(\frac{a}{b}\right)}{b^2c^2}-\frac{\mathrm{Shi}\left(\frac{a+b\,\mathrm{arcsinh}(c x)}{b}\right)\sinh\left(\frac{a}{b}\right)}{b^2c^2}$$

Result(type 4, 150 leaves):

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

Problem 125: Unable to integrate problem.

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

Optimal(type 4, 198 leaves, 27 steps):

$$-\frac{3d\,\mathrm{e}^{\frac{2a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{2}\sqrt{a+b\,\mathrm{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{32b^{3/2}c^4}-\frac{3d\,\mathrm{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\,\mathrm{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{32b^{3/2}c^4\,\mathrm{e}^{\frac{2a}{b}}}+\frac{d\,\mathrm{e}^{\frac{6a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{6}\sqrt{a+b\,\mathrm{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{6}\sqrt{\pi}}{32b^{3/2}c^4}$$
$$+\frac{d\,\mathrm{erfi}\left(\frac{\sqrt{6}\sqrt{a+b\,\mathrm{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{6}\sqrt{\pi}}{32b^{3/2}c^4\,\mathrm{e}^{\frac{6a}{b}}}-\frac{2dx^3\,(c^2x^2+1)^{3/2}}{b c\sqrt{a+b\,\mathrm{arcsinh}(c x)}}$$

Result(type 8, 26 leaves):

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

Problem 126: Unable to integrate problem.

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

Optimal(type 4, 266 leaves, 32 steps):

$$\frac{d\, e^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{\pi}}{8 b^{3/2} c^3} - \frac{d \operatorname{erfi}\left(\frac{\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{\pi}}{8 b^{3/2} c^3 e^{\frac{a}{b}}} - \frac{d\, e^{\frac{3a}{b}} \operatorname{erf}\left(\frac{\sqrt{3}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{3}\sqrt{\pi}}{16 b^{3/2} c^3}$$

$$+ \frac{d \operatorname{erfi}\left(\frac{\sqrt{3}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{3}\sqrt{\pi}}{16 b^{3/2} c^3 e^{\frac{3a}{b}}} - \frac{d\, e^{\frac{5a}{b}} \operatorname{erf}\left(\frac{\sqrt{5}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{5}\sqrt{\pi}}{16 b^{3/2} c^3} + \frac{d \operatorname{erfi}\left(\frac{\sqrt{5}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{5}\sqrt{\pi}}{16 b^{3/2} c^3 e^{\frac{5a}{b}}}$$

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

Result(type 8, 26 leaves):

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

Problem 127: Unable to integrate problem.

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

Optimal(type 4, 372 leaves, 32 steps):

$$- \frac{3 d^2 e^{\frac{2a}{b}} \operatorname{erf}\left(\frac{\sqrt{2}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{2}\sqrt{\pi}}{64 b^{3/2} c^4} + \frac{d^2 e^{\frac{8a}{b}} \operatorname{erf}\left(\frac{2\sqrt{2}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{2}\sqrt{\pi}}{64 b^{3/2} c^4} - \frac{3 d^2 \operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{2}\sqrt{\pi}}{64 b^{3/2} c^4 e^{\frac{2a}{b}}}$$

$$+ \frac{d^2 \operatorname{erfi}\left(\frac{2\sqrt{2}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{2}\sqrt{\pi}}{64 b^{3/2} c^4 e^{\frac{8a}{b}}} - \frac{d^2 e^{\frac{4a}{b}} \operatorname{erf}\left(\frac{2\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{\pi}}{32 b^{3/2} c^4} - \frac{d^2 \operatorname{erfi}\left(\frac{2\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{\pi}}{32 b^{3/2} c^4 e^{\frac{4a}{b}}}$$

$$+ \frac{d^2 e^{\frac{6a}{b}} \operatorname{erf}\left(\frac{\sqrt{6}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{6}\sqrt{\pi}}{64 b^{3/2} c^4} + \frac{d^2 \operatorname{erfi}\left(\frac{\sqrt{6}\sqrt{a+b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{6}\sqrt{\pi}}{64 b^{3/2} c^4 e^{\frac{6a}{b}}} - \frac{2 d^2 x^3 (c^2 x^2+1)^{5/2}}{b c \sqrt{a+b \operatorname{arcsinh}(c x)}}$$

Result(type 8, 28 leaves):

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

Problem 128: Unable to integrate problem.

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

Optimal(type 4, 366 leaves, 42 steps):

$$\frac{5 d^2 e^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a + b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{\pi}}{64 b^{3/2} c^3} - \frac{5 d^2 \operatorname{erfi}\left(\frac{\sqrt{a + b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{\pi}}{64 b^{3/2} c^3 e^{\frac{a}{b}}} - \frac{d^2 e^{\frac{3 a}{b}} \operatorname{erf}\left(\frac{\sqrt{3} \sqrt{a + b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{3} \sqrt{\pi}}{64 b^{3/2} c^3}$$
$$+ \frac{d^2 \operatorname{erfi}\left(\frac{\sqrt{3} \sqrt{a + b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{3} \sqrt{\pi}}{64 b^{3/2} c^3 e^{\frac{3 a}{b}}} - \frac{3 d^2 e^{\frac{5 a}{b}} \operatorname{erf}\left(\frac{\sqrt{5} \sqrt{a + b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{5} \sqrt{\pi}}{64 b^{3/2} c^3} + \frac{3 d^2 \operatorname{erfi}\left(\frac{\sqrt{5} \sqrt{a + b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{5} \sqrt{\pi}}{64 b^{3/2} c^3 e^{\frac{5 a}{b}}}$$
$$- \frac{d^2 e^{\frac{7 a}{b}} \operatorname{erf}\left(\frac{\sqrt{7} \sqrt{a + b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{7} \sqrt{\pi}}{64 b^{3/2} c^3} + \frac{d^2 \operatorname{erfi}\left(\frac{\sqrt{7} \sqrt{a + b \operatorname{arcsinh}(c x)}}{\sqrt{b}}\right) \sqrt{7} \sqrt{\pi}}{64 b^{3/2} c^3 e^{\frac{7 a}{b}}} - \frac{2 d^2 x^2 (c^2 x^2 + 1)^{5/2}}{b c \sqrt{a + b \operatorname{arcsinh}(c x)}}$$

Result(type 8, 28 leaves):

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

Problem 130: Unable to integrate problem.

$$\int (a^2 c x^2 + c)^{3/2} \sqrt{\operatorname{arcsinh}(a x)} \, dx$$

Optimal(type 4, 253 leaves, 24 steps):

$$\frac{c \operatorname{arcsinh}(a x)^{3/2} \sqrt{a^2 c x^2 + c}}{4 a \sqrt{a^2 x^2 + 1}} + \frac{c \operatorname{erf}\left(\sqrt{2} \sqrt{\operatorname{arcsinh}(a x)}\right) \sqrt{2} \sqrt{\pi} \sqrt{a^2 c x^2 + c}}{32 a \sqrt{a^2 x^2 + 1}} - \frac{c \operatorname{erfi}\left(\sqrt{2} \sqrt{\operatorname{arcsinh}(a x)}\right) \sqrt{2} \sqrt{\pi} \sqrt{a^2 c x^2 + c}}{32 a \sqrt{a^2 x^2 + 1}}$$
$$+ \frac{c \operatorname{erf}\left(2 \sqrt{\operatorname{arcsinh}(a x)}\right) \sqrt{\pi} \sqrt{a^2 c x^2 + c}}{256 a \sqrt{a^2 x^2 + 1}} - \frac{c \operatorname{erfi}\left(2 \sqrt{\operatorname{arcsinh}(a x)}\right) \sqrt{\pi} \sqrt{a^2 c x^2 + c}}{256 a \sqrt{a^2 x^2 + 1}} + \frac{x (a^2 c x^2 + c)^{3/2} \sqrt{\operatorname{arcsinh}(a x)}}{4}$$
$$+ \frac{3 c x \sqrt{a^2 c x^2 + c} \sqrt{\operatorname{arcsinh}(a x)}}{8}$$

Result(type 8, 21 leaves):

$$\int (a^2 c x^2 + c)^{3/2} \sqrt{\operatorname{arcsinh}(a x)} \, dx$$

Problem 134: Unable to integrate problem.

$$\int \operatorname{arcsinh}\left(\frac{x}{a}\right)^{3/2} \sqrt{a^2+x^2}\, dx$$

Optimal(type 4, 203 leaves, 11 steps):

$$\frac{x \operatorname{arcsinh}\left(\frac{x}{a}\right)^{3/2} \sqrt{a^2+x^2}}{2} + \frac{a \operatorname{arcsinh}\left(\frac{x}{a}\right)^{5/2} \sqrt{a^2+x^2}}{5 \sqrt{1+\frac{x^2}{a^2}}} + \frac{3 a \operatorname{erf}\left(\sqrt{2} \sqrt{\operatorname{arcsinh}\left(\frac{x}{a}\right)}\right) \sqrt{2} \sqrt{\pi} \sqrt{a^2+x^2}}{128 \sqrt{1+\frac{x^2}{a^2}}}$$
$$+ \frac{3 a \operatorname{erfi}\left(\sqrt{2} \sqrt{\operatorname{arcsinh}\left(\frac{x}{a}\right)}\right) \sqrt{2} \sqrt{\pi} \sqrt{a^2+x^2}}{128 \sqrt{1+\frac{x^2}{a^2}}} - \frac{3 a \sqrt{a^2+x^2} \sqrt{\operatorname{arcsinh}\left(\frac{x}{a}\right)}}{16 \sqrt{1+\frac{x^2}{a^2}}} - \frac{3 x^2 \sqrt{a^2+x^2} \sqrt{\operatorname{arcsinh}\left(\frac{x}{a}\right)}}{8 a \sqrt{1+\frac{x^2}{a^2}}}$$

Result(type 8, 20 leaves):

$$\int \operatorname{arcsinh}\left(\frac{x}{a}\right)^{3/2} \sqrt{a^2+x^2}\, dx$$

Problem 136: Unable to integrate problem.

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

Optimal(type 4, 21 leaves, 6 steps):

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

Result(type 8, 15 leaves):

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

Problem 140: Unable to integrate problem.

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

Optimal(type 4, 706 leaves, 15 steps):

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

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

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

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

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

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

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

Result(type 8, 26 leaves):

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

Problem 141: Unable to integrate problem.

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

Optimal(type 4, 105 leaves, 9 steps):

$$\frac{3^{-1-n} \operatorname{arcsinh}(ax)^n \Gamma(1+n, -3\operatorname{arcsinh}(ax))}{8a^4 (-\operatorname{arcsinh}(ax))^n}-\frac{3\operatorname{arcsinh}(ax)^n \Gamma(1+n, -\operatorname{arcsinh}(ax))}{8a^4 (-\operatorname{arcsinh}(ax))^n}-\frac{3\Gamma(1+n, \operatorname{arcsinh}(ax))}{8a^4}+\frac{3^{-1-n}\Gamma(1+n, 3\operatorname{arcsinh}(ax))}{8a^4}$$

Result(type 8, 23 leaves):

$$\int \frac{x^3 \operatorname{arcsinh}(a x)^n}{\sqrt{a^2 x^2+1}}\, dx$$

Problem 142: Unable to integrate problem.

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

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

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

Result(type 8, 21 leaves):

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

Problem 143: Unable to integrate problem.

$$\int (a+b \operatorname{arcsinh}(c x)) \sqrt{d+I c d x}\, \sqrt{f-I c f x}\, dx$$

Optimal(type 3, 119 leaves, 4 steps):

$$\frac{x (a+b \operatorname{arcsinh}(c x)) \sqrt{d+I c d x}\, \sqrt{f-I c f x}}{2}-\frac{b c x^2 \sqrt{d+I c d x}\, \sqrt{f-I c f x}}{4 \sqrt{c^2 x^2+1}}+\frac{(a+b \operatorname{arcsinh}(c x))^2 \sqrt{d+I c d x}\, \sqrt{f-I c f x}}{4 b c \sqrt{c^2 x^2+1}}$$

Result(type 8, 31 leaves):

$$\int (a+b \operatorname{arcsinh}(c x)) \sqrt{d+I c d x}\, \sqrt{f-I c f x}\, dx$$

Problem 144: Unable to integrate problem.

$$\int (d+I c d x)^{5/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))\, dx$$

Optimal(type 3, 371 leaves, 12 steps):

$$-\frac{I b d x (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{5 \left(c^2 x^2+1\right)^{3/2}}-\frac{5 b c d x^2 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{16 \left(c^2 x^2+1\right)^{3/2}}-\frac{2 I b c^2 d x^3 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{15 \left(c^2 x^2+1\right)^{3/2}}$$
$$-\frac{b c^3 d x^4 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{16 \left(c^2 x^2+1\right)^{3/2}}-\frac{I b c^4 d x^5 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{25 \left(c^2 x^2+1\right)^{3/2}}+\frac{d x (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))}{4}$$
$$+\frac{3 d x (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))}{8 \left(c^2 x^2+1\right)}+\frac{I d (d+I c d x)^{3/2} (f-I c f x)^{3/2} \left(c^2 x^2+1\right) (a+b \operatorname{arcsinh}(c x))}{5 c}$$

$$+\frac{3 d (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))^2}{16 b c (c^2 x^2+1)^{3/2}}$$

Result(type 8, 31 leaves):

$$\int (d+I c d x)^{5/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))\, dx$$

Problem 145: Unable to integrate problem.

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

Optimal(type 3, 201 leaves, 7 steps):

$$-\frac{5 b c x^2 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{16 (c^2 x^2+1)^{3/2}}-\frac{b c^3 x^4 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{16 (c^2 x^2+1)^{3/2}}+\frac{x (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))}{4}$$
$$+\frac{3 x (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))}{8 (c^2 x^2+1)}+\frac{3 (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))^2}{16 b c (c^2 x^2+1)^{3/2}}$$

Result(type 8, 31 leaves):

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

Problem 146: Unable to integrate problem.

$$\int (d+I c d x)^{3/2} (f-I c f x)^{5/2} (a+b \operatorname{arcsinh}(c x))\, dx$$

Optimal(type 3, 371 leaves, 12 steps):

$$\frac{I b f x (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{5 (c^2 x^2+1)^{3/2}}-\frac{5 b c f x^2 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{16 (c^2 x^2+1)^{3/2}}+\frac{2 I b c^2 f x^3 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{15 (c^2 x^2+1)^{3/2}}$$
$$-\frac{b c^3 f x^4 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{16 (c^2 x^2+1)^{3/2}}+\frac{I b c^4 f x^5 (d+I c d x)^{3/2} (f-I c f x)^{3/2}}{25 (c^2 x^2+1)^{3/2}}+\frac{f x (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))}{4}$$
$$+\frac{3 f x (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))}{8 (c^2 x^2+1)}-\frac{I f (d+I c d x)^{3/2} (f-I c f x)^{3/2} (c^2 x^2+1) (a+b \operatorname{arcsinh}(c x))}{5 c}$$
$$+\frac{3 f (d+I c d x)^{3/2} (f-I c f x)^{3/2} (a+b \operatorname{arcsinh}(c x))^2}{16 b c (c^2 x^2+1)^{3/2}}$$

Result(type 8, 31 leaves):

$$\int (d+I c d x)^{3/2} (f-I c f x)^{5/2} (a+b \operatorname{arcsinh}(c x))\, dx$$

Problem 147: Unable to integrate problem.

$$\int \frac{(d+\mathrm{I}cdx)^{3/2}(a+b\operatorname{arcsinh}(cx))}{\sqrt{f-\mathrm{I}cfx}}\,\mathrm{d}x$$

Optimal(type 3, 222 leaves, 9 steps):

$$\frac{2\mathrm{I}d^2\left(c^2x^2+1\right)(a+b\operatorname{arcsinh}(cx))}{c\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}-\frac{d^2x\left(c^2x^2+1\right)(a+b\operatorname{arcsinh}(cx))}{2\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}-\frac{2\mathrm{I}bd^2x\sqrt{c^2x^2+1}}{\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}+\frac{bcd^2x^2\sqrt{c^2x^2+1}}{4\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}$$
$$+\frac{3d^2(a+b\operatorname{arcsinh}(cx))^2\sqrt{c^2x^2+1}}{4bc\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}$$

Result(type 8, 31 leaves):

$$\int \frac{(d+\mathrm{I}cdx)^{3/2}(a+b\operatorname{arcsinh}(cx))}{\sqrt{f-\mathrm{I}cfx}}\,\mathrm{d}x$$

Problem 148: Unable to integrate problem.

$$\int \frac{a+b\operatorname{arcsinh}(cx)}{(d+\mathrm{I}cdx)^{3/2}\sqrt{f-\mathrm{I}cfx}}\,\mathrm{d}x$$

Optimal(type 3, 95 leaves, 5 steps):

$$\frac{f(\mathrm{I}+cx)\left(c^2x^2+1\right)(a+b\operatorname{arcsinh}(cx))}{c(d+\mathrm{I}cdx)^{3/2}(f-\mathrm{I}cfx)^{3/2}}-\frac{bf\left(c^2x^2+1\right)^{3/2}\ln(\mathrm{I}-cx)}{c(d+\mathrm{I}cdx)^{3/2}(f-\mathrm{I}cfx)^{3/2}}$$

Result(type 8, 31 leaves):

$$\int \frac{a+b\operatorname{arcsinh}(cx)}{(d+\mathrm{I}cdx)^{3/2}\sqrt{f-\mathrm{I}cfx}}\,\mathrm{d}x$$

Problem 149: Unable to integrate problem.

$$\int \frac{a+b\operatorname{arcsinh}(cx)}{(d+\mathrm{I}cdx)^{5/2}\sqrt{f-\mathrm{I}cfx}}\,\mathrm{d}x$$

Optimal(type 3, 244 leaves, 8 steps):

$$\frac{\mathrm{I}bf^2\left(c^2x^2+1\right)^{5/2}}{3c(\mathrm{I}-cx)(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}+\frac{2\mathrm{I}f^2(1-\mathrm{I}cx)\left(c^2x^2+1\right)(a+b\operatorname{arcsinh}(cx))}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}+\frac{f^2x\left(c^2x^2+1\right)^2(a+b\operatorname{arcsinh}(cx))}{3(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$
$$-\frac{\mathrm{I}bf^2\left(c^2x^2+1\right)^{5/2}\arctan(cx)}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}-\frac{bf^2\left(c^2x^2+1\right)^{5/2}\ln\left(c^2x^2+1\right)}{6c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$

Result(type 8, 31 leaves):

$$\int \frac{a+b\operatorname{arcsinh}(cx)}{(d+\mathrm{I}cdx)^{5/2}\sqrt{f-\mathrm{I}cfx}}\,\mathrm{d}x$$

Problem 150: Unable to integrate problem.

$$\int \frac{(d + I c d x)^{5/2} (a + b \operatorname{arcsinh}(c x))}{(f - I c f x)^{3/2}}\, dx$$

Optimal(type 3, 431 leaves, 7 steps):

$$\frac{3 I b d^4 x (c^2 x^2 + 1)^{3/2}}{2 (d + I c d x)^{3/2} (f - I c f x)^{3/2}} + \frac{b c d^4 x^2 (c^2 x^2 + 1)^{3/2}}{(d + I c d x)^{3/2} (f - I c f x)^{3/2}} + \frac{5 b d^4 (1 + I c x)^2 (c^2 x^2 + 1)^{3/2}}{4 c (d + I c d x)^{3/2} (f - I c f x)^{3/2}} + \frac{15 b d^4 (c^2 x^2 + 1)^{3/2} \operatorname{arcsinh}(c x)^2}{4 c (d + I c d x)^{3/2} (f - I c f x)^{3/2}}$$
$$- \frac{2 I d^4 (1 + I c x)^3 (c^2 x^2 + 1) (a + b \operatorname{arcsinh}(c x))}{c (d + I c d x)^{3/2} (f - I c f x)^{3/2}} - \frac{15 I d^4 (c^2 x^2 + 1)^2 (a + b \operatorname{arcsinh}(c x))}{2 c (d + I c d x)^{3/2} (f - I c f x)^{3/2}} - \frac{5 I d^4 (1 + I c x) (c^2 x^2 + 1)^2 (a + b \operatorname{arcsinh}(c x))}{2 c (d + I c d x)^{3/2} (f - I c f x)^{3/2}}$$
$$- \frac{15 d^4 (c^2 x^2 + 1)^{3/2} \operatorname{arcsinh}(c x) (a + b \operatorname{arcsinh}(c x))}{2 c (d + I c d x)^{3/2} (f - I c f x)^{3/2}} - \frac{8 b d^4 (c^2 x^2 + 1)^{3/2} \ln(I + c x)}{c (d + I c d x)^{3/2} (f - I c f x)^{3/2}}$$

Result(type 8, 31 leaves):

$$\int \frac{(d + I c d x)^{5/2} (a + b \operatorname{arcsinh}(c x))}{(f - I c f x)^{3/2}}\, dx$$

Problem 151: Unable to integrate problem.

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

Optimal(type 3, 153 leaves, 8 steps):

$$-\frac{2 I d^2 (1 + I c x) (c^2 x^2 + 1) (a + b \operatorname{arcsinh}(c x))}{c (d + I c d x)^{3/2} (f - I c f x)^{3/2}} - \frac{d^2 (c^2 x^2 + 1)^{3/2} (a + b \operatorname{arcsinh}(c x))^2}{2 b c (d + I c d x)^{3/2} (f - I c f x)^{3/2}} - \frac{2 b d^2 (c^2 x^2 + 1)^{3/2} \ln(I + c x)}{c (d + I c d x)^{3/2} (f - I c f x)^{3/2}}$$

Result(type 8, 31 leaves):

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

Problem 152: Unable to integrate problem.

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

Optimal(type 3, 96 leaves, 5 steps):

$$-\frac{d (I - c x) (c^2 x^2 + 1) (a + b \operatorname{arcsinh}(c x))}{c (d + I c d x)^{3/2} (f - I c f x)^{3/2}} - \frac{b d (c^2 x^2 + 1)^{3/2} \ln(I + c x)}{c (d + I c d x)^{3/2} (f - I c f x)^{3/2}}$$

Result(type 8, 31 leaves):

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

Problem 153: Unable to integrate problem.

$$\int \frac{a+b\operatorname{arcsinh}(cx)}{(f-\mathrm{I}cfx)^{5/2}\sqrt{d+\mathrm{I}cdx}}\,dx$$

Optimal(type 3, 243 leaves, 8 steps):

$$\frac{\mathrm{I}bd^2\left(c^2x^2+1\right)^{5/2}}{3c(\mathrm{I}+cx)(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}-\frac{2\mathrm{I}d^2(1+\mathrm{I}cx)\left(c^2x^2+1\right)(a+b\operatorname{arcsinh}(cx))}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}+\frac{d^2x\left(c^2x^2+1\right)^2(a+b\operatorname{arcsinh}(cx))}{3(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$
$$+\frac{\mathrm{I}bd^2\left(c^2x^2+1\right)^{5/2}\arctan(cx)}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}-\frac{bd^2\left(c^2x^2+1\right)^{5/2}\ln\left(c^2x^2+1\right)}{6c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$

Result(type 8, 31 leaves):

$$\int \frac{a+b\operatorname{arcsinh}(cx)}{(f-\mathrm{I}cfx)^{5/2}\sqrt{d+\mathrm{I}cdx}}\,dx$$

Problem 154: Unable to integrate problem.

$$\int (a+b\operatorname{arcsinh}(cx))^2\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}\,dx$$

Optimal(type 3, 198 leaves, 6 steps):

$$\frac{b^2x\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}{4}+\frac{x(a+b\operatorname{arcsinh}(cx))^2\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}{2}-\frac{b^2\operatorname{arcsinh}(cx)\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}{4c\sqrt{c^2x^2+1}}$$
$$-\frac{bcx^2(a+b\operatorname{arcsinh}(cx))\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}{2\sqrt{c^2x^2+1}}+\frac{(a+b\operatorname{arcsinh}(cx))^3\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}{6bc\sqrt{c^2x^2+1}}$$

Result(type 8, 33 leaves):

$$\int (a+b\operatorname{arcsinh}(cx))^2\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}\,dx$$

Problem 155: Unable to integrate problem.

$$\int \frac{(f-\mathrm{I}cfx)^{3/2}(a+b\operatorname{arcsinh}(cx))^2}{\sqrt{d+\mathrm{I}cdx}}\,dx$$

Optimal(type 3, 367 leaves, 11 steps):

$$-\frac{4\mathrm{I}b^2f^2\left(c^2x^2+1\right)}{c\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}-\frac{b^2f^2x\left(c^2x^2+1\right)}{4\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}-\frac{2\mathrm{I}f^2\left(c^2x^2+1\right)(a+b\operatorname{arcsinh}(cx))^2}{c\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}-\frac{f^2x\left(c^2x^2+1\right)(a+b\operatorname{arcsinh}(cx))^2}{2\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}$$
$$+\frac{b^2f^2\operatorname{arcsinh}(cx)\sqrt{c^2x^2+1}}{4c\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}+\frac{4\mathrm{I}bf^2x(a+b\operatorname{arcsinh}(cx))\sqrt{c^2x^2+1}}{\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}+\frac{bcf^2x^2(a+b\operatorname{arcsinh}(cx))\sqrt{c^2x^2+1}}{2\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}$$
$$+\frac{f^2(a+b\operatorname{arcsinh}(cx))^3\sqrt{c^2x^2+1}}{2bc\sqrt{d+\mathrm{I}cdx}\,\sqrt{f-\mathrm{I}cfx}}$$

Result(type 8, 33 leaves):

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

Problem 156: Unable to integrate problem.

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

Optimal(type 3, 217 leaves, 8 steps):

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

Result(type 8, 33 leaves):

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

Problem 157: Unable to integrate problem.

$$\int \frac{(a + b \operatorname{arcsinh}(c x))^2}{(d + \mathrm{I} c d x)^{5/2} \sqrt{f - \mathrm{I} c f x}} \, dx$$

Optimal(type 4, 833 leaves, 30 steps):

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

Result(type 8, 33 leaves):

$$\int \frac{(a+b\operatorname{arcsinh}(cx))^2}{(d+\mathrm{I}cdx)^{5/2}\sqrt{f-\mathrm{I}cfx}}\,dx$$

Problem 158: Unable to integrate problem.

$$\int \frac{(a+b\operatorname{arcsinh}(cx))^2}{(d+\mathrm{I}cdx)^{3/2}(f-\mathrm{I}cfx)^{3/2}}\,dx$$

Optimal(type 4, 212 leaves, 7 steps):

$$\frac{x(c^2x^2+1)(a+b\operatorname{arcsinh}(cx))^2}{(d+\mathrm{I}cdx)^{3/2}(f-\mathrm{I}cfx)^{3/2}}+\frac{(c^2x^2+1)^{3/2}(a+b\operatorname{arcsinh}(cx))^2}{c(d+\mathrm{I}cdx)^{3/2}(f-\mathrm{I}cfx)^{3/2}}-\frac{2b(c^2x^2+1)^{3/2}(a+b\operatorname{arcsinh}(cx))\ln\left(1+\left(cx+\sqrt{c^2x^2+1}\right)^2\right)}{c(d+\mathrm{I}cdx)^{3/2}(f-\mathrm{I}cfx)^{3/2}}$$
$$-\frac{b^2(c^2x^2+1)^{3/2}\operatorname{polylog}\left(2,-\left(cx+\sqrt{c^2x^2+1}\right)^2\right)}{c(d+\mathrm{I}cdx)^{3/2}(f-\mathrm{I}cfx)^{3/2}}$$

Result(type 8, 33 leaves):

$$\int \frac{(a+b\operatorname{arcsinh}(cx))^2}{(d+\mathrm{I}cdx)^{3/2}(f-\mathrm{I}cfx)^{3/2}}\,dx$$

Problem 159: Unable to integrate problem.

$$\int \frac{(d+\mathrm{I}cdx)^{3/2}(a+b\operatorname{arcsinh}(cx))^2}{(f-\mathrm{I}cfx)^{5/2}}\,dx$$

Optimal(type 4, 492 leaves, 21 steps):

$$\frac{8d^4(c^2x^2+1)^{5/2}(a+b\operatorname{arcsinh}(cx))^2}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}+\frac{d^4(c^2x^2+1)^{5/2}(a+b\operatorname{arcsinh}(cx))^3}{3bc(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$
$$+\frac{32bd^4(c^2x^2+1)^{5/2}(a+b\operatorname{arcsinh}(cx))\ln\left(1+\frac{\mathrm{I}}{cx+\sqrt{c^2x^2+1}}\right)}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}-\frac{32b^2d^4(c^2x^2+1)^{5/2}\operatorname{polylog}\left(2,\frac{-\mathrm{I}}{cx+\sqrt{c^2x^2+1}}\right)}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$
$$+\frac{4bd^4(c^2x^2+1)^{5/2}(a+b\operatorname{arcsinh}(cx))\sec\left(\frac{\pi}{4}+\frac{\mathrm{I}\operatorname{arcsinh}(cx)}{2}\right)^2}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}+\frac{8\mathrm{I}b^2d^4(c^2x^2+1)^{5/2}\tan\left(\frac{\pi}{4}+\frac{\mathrm{I}\operatorname{arcsinh}(cx)}{2}\right)}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$
$$+\frac{8\mathrm{I}d^4(c^2x^2+1)^{5/2}(a+b\operatorname{arcsinh}(cx))^2\tan\left(\frac{\pi}{4}+\frac{\mathrm{I}\operatorname{arcsinh}(cx)}{2}\right)}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$
$$-\frac{2\mathrm{I}d^4(c^2x^2+1)^{5/2}(a+b\operatorname{arcsinh}(cx))^2\sec\left(\frac{\pi}{4}+\frac{\mathrm{I}\operatorname{arcsinh}(cx)}{2}\right)^2\tan\left(\frac{\pi}{4}+\frac{\mathrm{I}\operatorname{arcsinh}(cx)}{2}\right)}{3c(d+\mathrm{I}cdx)^{5/2}(f-\mathrm{I}cfx)^{5/2}}$$

Result(type 8, 33 leaves):

$$\int \frac{(d+\mathrm{I}\,c\,d\,x)^{3/2}\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{(f-\mathrm{I}\,c\,f\,x)^{5/2}}\,\mathrm{d}x$$

Problem 160: Unable to integrate problem.

$$\int \frac{(a+b\,\mathrm{arcsinh}(c\,x))^2}{(d+\mathrm{I}\,c\,d\,x)^{3/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}\,\mathrm{d}x$$

Optimal(type 4, 662 leaves, 21 steps):

$$\frac{\mathrm{I}\,b^2\,d\,(c^2x^2+1)^2}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}-\frac{b^2\,d\,x\,(c^2x^2+1)^2}{3\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}+\frac{b\,d\,(c^2x^2+1)^{3/2}\,(a+b\,\mathrm{arcsinh}(c\,x))}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}$$
$$+\frac{\mathrm{I}\,b\,d\,x\,(c^2x^2+1)^{3/2}\,(a+b\,\mathrm{arcsinh}(c\,x))}{3\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}-\frac{\mathrm{I}\,d\,(c^2x^2+1)\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}+\frac{d\,x\,(c^2x^2+1)\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}$$
$$+\frac{2\,d\,x\,(c^2x^2+1)^2\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}+\frac{2\,d\,(c^2x^2+1)^{5/2}\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}$$
$$+\frac{2\,\mathrm{I}\,b\,d\,(c^2x^2+1)^{5/2}\,(a+b\,\mathrm{arcsinh}(c\,x))\,\arctan\left(c\,x+\sqrt{c^2x^2+1}\right)}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}-\frac{4\,b\,d\,(c^2x^2+1)^{5/2}\,(a+b\,\mathrm{arcsinh}(c\,x))\,\ln\left(1+\left(c\,x+\sqrt{c^2x^2+1}\right)^2\right)}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}$$
$$+\frac{b^2\,d\,(c^2x^2+1)^{5/2}\,\mathrm{polylog}\left(2,-\mathrm{I}\left(c\,x+\sqrt{c^2x^2+1}\right)\right)}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}-\frac{b^2\,d\,(c^2x^2+1)^{5/2}\,\mathrm{polylog}\left(2,\mathrm{I}\left(c\,x+\sqrt{c^2x^2+1}\right)\right)}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}$$
$$-\frac{2\,b^2\,d\,(c^2x^2+1)^{5/2}\,\mathrm{polylog}\left(2,-\left(c\,x+\sqrt{c^2x^2+1}\right)^2\right)}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}$$

Result(type 8, 33 leaves):

$$\int \frac{(a+b\,\mathrm{arcsinh}(c\,x))^2}{(d+\mathrm{I}\,c\,d\,x)^{3/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}\,\mathrm{d}x$$

Problem 161: Unable to integrate problem.

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

Optimal(type 4, 340 leaves, 10 steps):

$$-\frac{b^2\,x\,(c^2x^2+1)^2}{3\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}+\frac{b\,(c^2x^2+1)^{3/2}\,(a+b\,\mathrm{arcsinh}(c\,x))}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}+\frac{x\,(c^2x^2+1)\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}+\frac{2\,x\,(c^2x^2+1)^2\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}$$
$$+\frac{2\,(c^2x^2+1)^{5/2}\,(a+b\,\mathrm{arcsinh}(c\,x))^2}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}-\frac{4\,b\,(c^2x^2+1)^{5/2}\,(a+b\,\mathrm{arcsinh}(c\,x))\,\ln\left(1+\left(c\,x+\sqrt{c^2x^2+1}\right)^2\right)}{3\,c\,(d+\mathrm{I}\,c\,d\,x)^{5/2}\,(f-\mathrm{I}\,c\,f\,x)^{5/2}}$$

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

Result(type 8, 33 leaves):

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

Problem 164: Result more than twice size of optimal antiderivative.

$$\int (e x^2 + d)^2 (a + b \operatorname{arcsinh}(cx))^2 \, dx$$

Optimal(type 3, 293 leaves, 17 steps):

$$2 b^2 d^2 x - \frac{8 b^2 d e x}{9 c^2} + \frac{16 b^2 e^2 x}{75 c^4} + \frac{4 b^2 d e x^3}{27} - \frac{8 b^2 e^2 x^3}{225 c^2} + \frac{2 b^2 e^2 x^5}{125} + d^2 x (a + b \operatorname{arcsinh}(cx))^2 + \frac{2 d e x^3 (a + b \operatorname{arcsinh}(cx))^2}{3} + \frac{e^2 x^5 (a + b \operatorname{arcsinh}(cx))^2}{5} - \frac{2 b d^2 (a + b \operatorname{arcsinh}(cx)) \sqrt{c^2 x^2 + 1}}{c} + \frac{8 b d e (a + b \operatorname{arcsinh}(cx)) \sqrt{c^2 x^2 + 1}}{9 c^3} - \frac{16 b e^2 (a + b \operatorname{arcsinh}(cx)) \sqrt{c^2 x^2 + 1}}{75 c^5} - \frac{4 b d e x^2 (a + b \operatorname{arcsinh}(cx)) \sqrt{c^2 x^2 + 1}}{9 c} + \frac{8 b e^2 x^2 (a + b \operatorname{arcsinh}(cx)) \sqrt{c^2 x^2 + 1}}{75 c^3} - \frac{2 b e^2 x^4 (a + b \operatorname{arcsinh}(cx)) \sqrt{c^2 x^2 + 1}}{25 c}$$

Result(type 3, 619 leaves):

$$\frac{1}{c} \Bigg(\frac{a^2 \left(\frac{1}{5} e^2 c^5 x^5 + \frac{2}{3} c^5 d e x^3 + x c^5 d^2 \right)}{c^4} + \frac{1}{c^4} \Bigg(b^2 \Bigg(\frac{1}{3375} \Big(e^2 \Big(675 \operatorname{arcsinh}(cx)^2 c^5 x^5 - 270 \operatorname{arcsinh}(cx) \sqrt{c^2 x^2 + 1}\, c^4 x^4 + 2250 \operatorname{arcsinh}(cx)^2 c^3 x^3 + 54 c^5 x^5 - 1140 \operatorname{arcsinh}(cx)\, c^2 x^2 \sqrt{c^2 x^2 + 1} + 3375 c x \operatorname{arcsinh}(cx)^2 + 380 c^3 x^3 - 4470 \sqrt{c^2 x^2 + 1} \operatorname{arcsinh}(cx) + 4470 c x \Big) \Big)$$

$$+ \frac{2 c^2 d e \left(9 \operatorname{arcsinh}(cx)^2 c^3 x^3 - 6 \operatorname{arcsinh}(cx)\, c^2 x^2 \sqrt{c^2 x^2 + 1} + 27 c x \operatorname{arcsinh}(cx)^2 + 2 c^3 x^3 - 42 \sqrt{c^2 x^2 + 1} \operatorname{arcsinh}(cx) + 42 c x\right)}{27}$$

$$- \frac{2 e^2 \left(9 \operatorname{arcsinh}(cx)^2 c^3 x^3 - 6 \operatorname{arcsinh}(cx)\, c^2 x^2 \sqrt{c^2 x^2 + 1} + 27 c x \operatorname{arcsinh}(cx)^2 + 2 c^3 x^3 - 42 \sqrt{c^2 x^2 + 1} \operatorname{arcsinh}(cx) + 42 c x\right)}{27}$$

$$+ d^2 c^4 \left(c x \operatorname{arcsinh}(c x)^2 - 2\sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x) + 2 c x\right) - 2 c^2 d e \left(c x \operatorname{arcsinh}(c x)^2 - 2\sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x) + 2 c x\right) + e^2 \left(c x \operatorname{arcsinh}(c x)^2\right.$$

$$\left. - 2\sqrt{c^2 x^2+1}\, \operatorname{arcsinh}(c x) + 2 c x\right)\Bigg)\Bigg) + \frac{1}{c^4}\Bigg(2 a b \Bigg(\frac{\operatorname{arcsinh}(c x)\, e^2 c^5 x^5}{5} + \frac{2 \operatorname{arcsinh}(c x)\, c^5 d e x^3}{3} + \operatorname{arcsinh}(c x)\, d^2 c^5 x$$

$$- \frac{e^2\left(\frac{c^4 x^4\sqrt{c^2 x^2+1}}{5} - \frac{4 c^2 x^2\sqrt{c^2 x^2+1}}{15} + \frac{8\sqrt{c^2 x^2+1}}{15}\right)}{5} - d^2 c^4\sqrt{c^2 x^2+1} - \frac{2 c^2 d e\left(\frac{c^2 x^2\sqrt{c^2 x^2+1}}{3} - \frac{2\sqrt{c^2 x^2+1}}{3}\right)}{3}\Bigg)\Bigg)\Bigg)$$

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Problem 165: Unable to integrate problem.
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$$\int \frac{(a + b \operatorname{arcsinh}(c x))^2}{e x^2 + d}\, dx$$

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Optimal(type 4, 719 leaves, 22 steps):
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$$\frac{(a + b \operatorname{arcsinh}(c x))^2 \ln\left(1 - \frac{\left(c x + \sqrt{c^2 x^2+1}\right)\sqrt{e}}{c\sqrt{-d} - \sqrt{-c^2 d + e}}\right)}{2\sqrt{-d}\,\sqrt{e}} - \frac{(a + b \operatorname{arcsinh}(c x))^2 \ln\left(1 + \frac{\left(c x + \sqrt{c^2 x^2+1}\right)\sqrt{e}}{c\sqrt{-d} - \sqrt{-c^2 d + e}}\right)}{2\sqrt{-d}\,\sqrt{e}}$$

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

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

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

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

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

Result(type 8, 22 leaves):

$$\int \frac{(a+b\operatorname{arcsinh}(cx))^2}{ex^2+d}\,dx$$

Problem 170: Result more than twice size of optimal antiderivative.

$$\int \frac{(ex^2+d)^2}{(a+b\operatorname{arcsinh}(cx))^2}\,dx$$

Optimal(type 4, 469 leaves, 26 steps):

$$\frac{d^2\cosh\left(\frac{a}{b}\right)\operatorname{Shi}\left(\frac{a+b\operatorname{arcsinh}(cx)}{b}\right)}{b^2 c} - \frac{d e\cosh\left(\frac{a}{b}\right)\operatorname{Shi}\left(\frac{a+b\operatorname{arcsinh}(cx)}{b}\right)}{2b^2c^3} + \frac{e^2\cosh\left(\frac{a}{b}\right)\operatorname{Shi}\left(\frac{a+b\operatorname{arcsinh}(cx)}{b}\right)}{8b^2c^5}$$
$$+\frac{3de\cosh\left(\frac{3a}{b}\right)\operatorname{Shi}\left(\frac{3(a+b\operatorname{arcsinh}(cx))}{b}\right)}{2b^2c^3} - \frac{9e^2\cosh\left(\frac{3a}{b}\right)\operatorname{Shi}\left(\frac{3(a+b\operatorname{arcsinh}(cx))}{b}\right)}{16b^2c^5} + \frac{5e^2\cosh\left(\frac{5a}{b}\right)\operatorname{Shi}\left(\frac{5(a+b\operatorname{arcsinh}(cx))}{b}\right)}{16b^2c^5}$$
$$-\frac{d^2\operatorname{Chi}\left(\frac{a+b\operatorname{arcsinh}(cx)}{b}\right)\sinh\left(\frac{a}{b}\right)}{b^2c} + \frac{de\operatorname{Chi}\left(\frac{a+b\operatorname{arcsinh}(cx)}{b}\right)\sinh\left(\frac{a}{b}\right)}{2b^2c^3} - \frac{e^2\operatorname{Chi}\left(\frac{a+b\operatorname{arcsinh}(cx)}{b}\right)\sinh\left(\frac{a}{b}\right)}{8b^2c^5}$$
$$-\frac{3de\operatorname{Chi}\left(\frac{3(a+b\operatorname{arcsinh}(cx))}{b}\right)\sinh\left(\frac{3a}{b}\right)}{2b^2c^3} + \frac{9e^2\operatorname{Chi}\left(\frac{3(a+b\operatorname{arcsinh}(cx))}{b}\right)\sinh\left(\frac{3a}{b}\right)}{16b^2c^5} - \frac{5e^2\operatorname{Chi}\left(\frac{5(a+b\operatorname{arcsinh}(cx))}{b}\right)\sinh\left(\frac{5a}{b}\right)}{16b^2c^5}$$
$$-\frac{d^2\sqrt{c^2x^2+1}}{bc(a+b\operatorname{arcsinh}(cx))} - \frac{2dex^2\sqrt{c^2x^2+1}}{bc(a+b\operatorname{arcsinh}(cx))} - \frac{e^2x^4\sqrt{c^2x^2+1}}{bc(a+b\operatorname{arcsinh}(cx))}$$

Result(type 4, 1035 leaves):

$$\frac{1}{c}\left(\frac{\left(16c^5x^5-16c^4x^4\sqrt{c^2x^2+1}+20c^3x^3-12c^2x^2\sqrt{c^2x^2+1}+5cx-\sqrt{c^2x^2+1}\right)e^2}{32c^4b(a+b\operatorname{arcsinh}(cx))} + \frac{5e^2\,\mathrm{e}^{\frac{5a}{b}}\operatorname{Ei}_1\left(5\operatorname{arcsinh}(cx)+\frac{5a}{b}\right)}{32c^4b^2}\right.$$
$$-\frac{e^2\left(16c^5x^5+20c^3x^3+16c^4x^4\sqrt{c^2x^2+1}+5cx+12c^2x^2\sqrt{c^2x^2+1}+\sqrt{c^2x^2+1}\right)}{32c^4b(a+b\operatorname{arcsinh}(cx))} - \frac{5e^2\,\mathrm{e}^{-\frac{5a}{b}}\operatorname{Ei}_1\left(-5\operatorname{arcsinh}(cx)-\frac{5a}{b}\right)}{32c^4b^2}$$
$$+\frac{\left(cx-\sqrt{c^2x^2+1}\right)d^2}{2b(a+b\operatorname{arcsinh}(cx))} + \frac{d^2\,\mathrm{e}^{\frac{a}{b}}\operatorname{Ei}_1\left(\operatorname{arcsinh}(cx)+\frac{a}{b}\right)}{2b^2} - \frac{\left(cx-\sqrt{c^2x^2+1}\right)de}{4c^2b(a+b\operatorname{arcsinh}(cx))} - \frac{de\,\mathrm{e}^{\frac{a}{b}}\operatorname{Ei}_1\left(\operatorname{arcsinh}(cx)+\frac{a}{b}\right)}{4c^2b^2}$$

$$+\frac{\left(cx-\sqrt{c^2x^2+1}\right)e^2}{16c^4b\left(a+b\,\mathrm{arcsinh}(cx)\right)}+\frac{e^2\,\mathrm{e}^{\frac{a}{b}}\,\mathrm{Ei}_1\left(\mathrm{arcsinh}(cx)+\frac{a}{b}\right)}{16c^4b^2}-\frac{d^2\left(cx+\sqrt{c^2x^2+1}\right)}{2b\left(a+b\,\mathrm{arcsinh}(cx)\right)}-\frac{d^2\,\mathrm{e}^{-\frac{a}{b}}\,\mathrm{Ei}_1\left(-\mathrm{arcsinh}(cx)-\frac{a}{b}\right)}{2b^2}$$

$$+\frac{de\left(cx+\sqrt{c^2x^2+1}\right)}{4c^2b\left(a+b\,\mathrm{arcsinh}(cx)\right)}+\frac{de\,\mathrm{e}^{-\frac{a}{b}}\,\mathrm{Ei}_1\left(-\mathrm{arcsinh}(cx)-\frac{a}{b}\right)}{4c^2b^2}-\frac{e^2\left(cx+\sqrt{c^2x^2+1}\right)}{16c^4b\left(a+b\,\mathrm{arcsinh}(cx)\right)}-\frac{e^2\,\mathrm{e}^{-\frac{a}{b}}\,\mathrm{Ei}_1\left(-\mathrm{arcsinh}(cx)-\frac{a}{b}\right)}{16c^4b^2}$$

$$+\frac{\left(4c^3x^3-4c^2x^2\sqrt{c^2x^2+1}+3cx-\sqrt{c^2x^2+1}\right)de}{4c^2b\left(a+b\,\mathrm{arcsinh}(cx)\right)}-\frac{3\left(4c^3x^3-4c^2x^2\sqrt{c^2x^2+1}+3cx-\sqrt{c^2x^2+1}\right)e^2}{32c^4b\left(a+b\,\mathrm{arcsinh}(cx)\right)}$$

$$+\frac{3e\,\mathrm{e}^{\frac{3a}{b}}\,\mathrm{Ei}_1\left(3\,\mathrm{arcsinh}(cx)+\frac{3a}{b}\right)d}{4c^2b^2}-\frac{9e^2\,\mathrm{e}^{\frac{3a}{b}}\,\mathrm{Ei}_1\left(3\,\mathrm{arcsinh}(cx)+\frac{3a}{b}\right)}{32c^4b^2}-\frac{e\left(4c^3x^3+3cx+4c^2x^2\sqrt{c^2x^2+1}+\sqrt{c^2x^2+1}\right)d}{4c^2b\left(a+b\,\mathrm{arcsinh}(cx)\right)}$$

$$\left.+\frac{3e^2\left(4c^3x^3+3cx+4c^2x^2\sqrt{c^2x^2+1}+\sqrt{c^2x^2+1}\right)}{32c^4b\left(a+b\,\mathrm{arcsinh}(cx)\right)}-\frac{3e\,\mathrm{e}^{-\frac{3a}{b}}\,\mathrm{Ei}_1\left(-3\,\mathrm{arcsinh}(cx)-\frac{3a}{b}\right)d}{4c^2b^2}+\frac{9e^2\,\mathrm{e}^{-\frac{3a}{b}}\,\mathrm{Ei}_1\left(-3\,\mathrm{arcsinh}(cx)-\frac{3a}{b}\right)}{32c^4b^2}\right)$$

Problem 172: Unable to integrate problem.

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

Optimal(type 4, 219 leaves, 21 steps):

$$\frac{e\,\mathrm{e}^{\frac{3a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{3}\sqrt{a+b\,\mathrm{arcsinh}(cx)}}{\sqrt{b}}\right)\sqrt{3}\sqrt{\pi}}{24c^3\sqrt{b}}+\frac{e\,\mathrm{erfi}\left(\frac{\sqrt{3}\sqrt{a+b\,\mathrm{arcsinh}(cx)}}{\sqrt{b}}\right)\sqrt{3}\sqrt{\pi}}{24c^3\,\mathrm{e}^{\frac{3a}{b}}\sqrt{b}}+\frac{d\,\mathrm{e}^{\frac{a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{a+b\,\mathrm{arcsinh}(cx)}}{\sqrt{b}}\right)\sqrt{\pi}}{2c\sqrt{b}}$$

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

Result(type 8, 20 leaves):

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

Problem 173: Unable to integrate problem.

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

Optimal(type 4, 281 leaves, 21 steps):

$$-\frac{d\,e^{\frac{a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{a + b\,\mathrm{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{\pi}}{b^{3/2}\,c} + \frac{e\,e^{\frac{a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{a + b\,\mathrm{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{\pi}}{4\,b^{3/2}\,c^3} + \frac{d\,\mathrm{erfi}\left(\frac{\sqrt{a + b\,\mathrm{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{\pi}}{b^{3/2}\,c\,e^{\frac{a}{b}}} - \frac{e\,\mathrm{erfi}\left(\frac{\sqrt{a + b\,\mathrm{arcsinh}(c x)}}{\sqrt{b}}\right)\sqrt{\pi}}{4\,b^{3/2}\,c^3\,e^{\frac{a}{b}}}$$

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

Result(type 8, 20 leaves):

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

Problem 174: Unable to integrate problem.

$$\int \frac{a + b\,\mathrm{arcsinh}(c x)}{(e x^2 + d)^{7/2}}\, dx$$

Optimal(type 3, 193 leaves, 8 steps):

$$\frac{x\,(a + b\,\mathrm{arcsinh}(c x))}{5\,d\,(e x^2 + d)^{5/2}} + \frac{4\,x\,(a + b\,\mathrm{arcsinh}(c x))}{15\,d^2\,(e x^2 + d)^{3/2}} - \frac{8\,b\,\mathrm{arctanh}\left(\frac{\sqrt{e}\,\sqrt{c^2 x^2 + 1}}{c\,\sqrt{e x^2 + d}}\right)}{15\,d^3\,\sqrt{e}} - \frac{b\,c\,\sqrt{c^2 x^2 + 1}}{15\,d\,(c^2 d - e)\,(e x^2 + d)^{3/2}} + \frac{8\,x\,(a + b\,\mathrm{arcsinh}(c x))}{15\,d^3\,\sqrt{e x^2 + d}}$$

$$-\frac{2\,b\,c\,(3\,c^2 d - 2\,e)\,\sqrt{c^2 x^2 + 1}}{15\,d^2\,(c^2 d - e)^2\,\sqrt{e x^2 + d}}$$

Result(type 8, 20 leaves):

$$\int \frac{a + b\,\mathrm{arcsinh}(c x)}{(e x^2 + d)^{7/2}}\, dx$$

Test results for the 100 problems in "7.1.5 Inverse hyperbolic sine functions.txt"

Problem 2: Unable to integrate problem.

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

Optimal(type 4, 402 leaves, 12 steps):

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

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

$$-\frac{6\operatorname{arcsinh}(cx)\operatorname{polylog}\left(3,-\frac{e\left(cx+\sqrt{c^2x^2+1}\right)}{cd-\sqrt{d^2c^2+e^2}}\right)}{e}-\frac{6\operatorname{arcsinh}(cx)\operatorname{polylog}\left(3,-\frac{e\left(cx+\sqrt{c^2x^2+1}\right)}{cd+\sqrt{d^2c^2+e^2}}\right)}{e}+\frac{6\operatorname{polylog}\left(4,-\frac{e\left(cx+\sqrt{c^2x^2+1}\right)}{cd-\sqrt{d^2c^2+e^2}}\right)}{e}$$

$$+\frac{6\operatorname{polylog}\left(4,-\frac{e\left(cx+\sqrt{c^2x^2+1}\right)}{cd+\sqrt{d^2c^2+e^2}}\right)}{e}$$

Result(type 8, 16 leaves):

$$\int\frac{\operatorname{arcsinh}(cx)^3}{ex+d}\,\mathrm{d}x$$

Problem 4: Result more than twice size of optimal antiderivative.

$$\int\frac{a+b\operatorname{arcsinh}(cx)}{(ex+d)^3}\,\mathrm{d}x$$

Optimal(type 3, 117 leaves, 4 steps):

$$\frac{-a-b\operatorname{arcsinh}(cx)}{2e(ex+d)^2}-\frac{b c^3 d\operatorname{arctanh}\left(\frac{-c^2dx+e}{\sqrt{d^2c^2+e^2}\sqrt{c^2x^2+1}}\right)}{2e\left(d^2c^2+e^2\right)^{3/2}}-\frac{bc\sqrt{c^2x^2+1}}{2\left(d^2c^2+e^2\right)(ex+d)}$$

Result(type 3, 278 leaves):

$$-\frac{c^2a}{2(cex+cd)^2e}-\frac{c^2b\operatorname{arcsinh}(cx)}{2(cex+cd)^2e}-\frac{c^2b\sqrt{\left(cx+\frac{cd}{e}\right)^2-\frac{2cd\left(cx+\frac{cd}{e}\right)}{e}+\frac{d^2c^2+e^2}{e^2}}}{2e\left(d^2c^2+e^2\right)\left(cx+\frac{cd}{e}\right)}$$

$$-\frac{c^3 b d \ln\left(\frac{\frac{2\left(d^2c^2+e^2\right)}{e^2}-\frac{2cd\left(cx+\frac{cd}{e}\right)}{e}+2\sqrt{\frac{d^2c^2+e^2}{e^2}}\sqrt{\left(cx+\frac{cd}{e}\right)^2-\frac{2cd\left(cx+\frac{cd}{e}\right)}{e}+\frac{d^2c^2+e^2}{e^2}}}{cx+\frac{cd}{e}}\right)}{2e^2\left(d^2c^2+e^2\right)\sqrt{\frac{d^2c^2+e^2}{e^2}}}$$

Problem 6: Unable to integrate problem.

$$\int \frac{(a+b\operatorname{arcsinh}(cx))^2}{ex+d}\,dx$$

Optimal(type 4, 331 leaves, 10 steps):

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

Result(type 8, 20 leaves):

$$\int \frac{(a+b\operatorname{arcsinh}(cx))^2}{ex+d}\,dx$$

Problem 8: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b\operatorname{arcsinh}(cx))^2}{(ex+d)^3}\,dx$$

Optimal(type 4, 365 leaves, 13 steps):

$$-\frac{(a+b\operatorname{arcsinh}(cx))^2}{2e(ex+d)^2}+\frac{b^2c^2\ln(ex+d)}{e\left(d^2c^2+e^2\right)}+\frac{bc^3d(a+b\operatorname{arcsinh}(cx))\ln\left(1+\frac{e\left(cx+\sqrt{c^2x^2+1}\right)}{cd-\sqrt{d^2c^2+e^2}}\right)}{e\left(d^2c^2+e^2\right)^{3/2}}$$

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

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

Result(type 4, 1012 leaves):

$$-\frac{c^2a^2}{2(cex+cd)^2e}-\frac{c^4b^2\operatorname{arcsinh}(cx)^2d^2}{2e(cex+cd)^2(d^2c^2+e^2)}-\frac{c^3b^2\operatorname{arcsinh}(cx)\,e\sqrt{c^2x^2+1}\,x}{(cex+cd)^2(d^2c^2+e^2)}-\frac{c^3b^2\operatorname{arcsinh}(cx)\,d\sqrt{c^2x^2+1}}{(cex+cd)^2(d^2c^2+e^2)}+\frac{c^4b^2\operatorname{arcsinh}(cx)\,ex^2}{(cex+cd)^2(d^2c^2+e^2)}$$

$$+\frac{2c^4b^2\operatorname{arcsinh}(cx)\,xd}{(cex+cd)^2(d^2c^2+e^2)}+\frac{c^4b^2\operatorname{arcsinh}(cx)\,d^2}{e(cex+cd)^2(d^2c^2+e^2)}-\frac{c^2b^2\operatorname{arcsinh}(cx)^2e}{2(cex+cd)^2(d^2c^2+e^2)}-\frac{2c^2b^2\ln\left(cx+\sqrt{c^2x^2+1}\right)}{e(d^2c^2+e^2)}$$

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

$$-\frac{c^3b^2d\operatorname{arcsinh}(cx)\ln\left(\frac{\left(cx+\sqrt{c^2x^2+1}\right)e+cd+\sqrt{d^2c^2+e^2}}{cd+\sqrt{d^2c^2+e^2}}\right)}{e(d^2c^2+e^2)^{3/2}}+\frac{c^3b^2d\operatorname{dilog}\left(\frac{-\left(cx+\sqrt{c^2x^2+1}\right)e-cd+\sqrt{d^2c^2+e^2}}{-cd+\sqrt{d^2c^2+e^2}}\right)}{e(d^2c^2+e^2)^{3/2}}$$

$$-\frac{c^3b^2d\operatorname{dilog}\left(\frac{\left(cx+\sqrt{c^2x^2+1}\right)e+cd+\sqrt{d^2c^2+e^2}}{cd+\sqrt{d^2c^2+e^2}}\right)}{e(d^2c^2+e^2)^{3/2}}-\frac{c^2ab\operatorname{arcsinh}(cx)}{(cex+cd)^2e}-\frac{c^2ab\sqrt{\left(cx+\frac{cd}{e}\right)^2-\frac{2cd\left(cx+\frac{cd}{e}\right)}{e}+\frac{d^2c^2+e^2}{e^2}}}{e(d^2c^2+e^2)\left(cx+\frac{cd}{e}\right)}$$

$$-\frac{c^3abd\ln\left(\frac{\frac{2(d^2c^2+e^2)}{e^2}-\frac{2cd\left(cx+\frac{cd}{e}\right)}{e}+2\sqrt{\frac{d^2c^2+e^2}{e^2}}\sqrt{\left(cx+\frac{cd}{e}\right)^2-\frac{2cd\left(cx+\frac{cd}{e}\right)}{e}+\frac{d^2c^2+e^2}{e^2}}}{cx+\frac{cd}{e}}\right)}{e^2(d^2c^2+e^2)\sqrt{\frac{d^2c^2+e^2}{e^2}}}$$

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

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

Optimal(type 3, 373 leaves, 13 steps):

$$\frac{f^2 x (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{2}+\frac{g^2 x (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{8 c^2}+\frac{g^2 x^3 (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{4}$$
$$+\frac{2 f g (c^2 x^2+1) (a+b \operatorname{arcsinh}(c x)) \sqrt{c^2 d x^2+d}}{3 c^2}-\frac{2 b f g x \sqrt{c^2 d x^2+d}}{3 c \sqrt{c^2 x^2+1}}-\frac{b c f^2 x^2 \sqrt{c^2 d x^2+d}}{4 \sqrt{c^2 x^2+1}}-\frac{b g^2 x^2 \sqrt{c^2 d x^2+d}}{16 c \sqrt{c^2 x^2+1}}-\frac{2 b c f g x^3 \sqrt{c^2 d x^2+d}}{9 \sqrt{c^2 x^2+1}}$$
$$-\frac{b c g^2 x^4 \sqrt{c^2 d x^2+d}}{16 \sqrt{c^2 x^2+1}}+\frac{f^2 (a+b \operatorname{arcsinh}(c x))^2 \sqrt{c^2 d x^2+d}}{4 b c \sqrt{c^2 x^2+1}}-\frac{g^2 (a+b \operatorname{arcsinh}(c x))^2 \sqrt{c^2 d x^2+d}}{16 b c^3 \sqrt{c^2 x^2+1}}$$

Result(type 3, 790 leaves):

$$\frac{a f^2 x \sqrt{c^2 d x^2+d}}{2}+\frac{a f^2 d \ln\left(\frac{x c^2 d}{\sqrt{c^2 d}}+\sqrt{c^2 d x^2+d}\right)}{2 \sqrt{c^2 d}}+\frac{a g^2 x (c^2 d x^2+d)^{3/2}}{4 c^2 d}-\frac{a g^2 x \sqrt{c^2 d x^2+d}}{8 c^2}-\frac{a g^2 d \ln\left(\frac{x c^2 d}{\sqrt{c^2 d}}+\sqrt{c^2 d x^2+d}\right)}{8 c^2 \sqrt{c^2 d}}$$
$$+\frac{2 a f g (c^2 d x^2+d)^{3/2}}{3 c^2 d}-\frac{2 b \sqrt{d (c^2 x^2+1)}\, f g c x^3}{9 \sqrt{c^2 x^2+1}}+\frac{4 b \sqrt{d (c^2 x^2+1)}\, f g \operatorname{arcsinh}(c x) x^2}{3 (c^2 x^2+1)}-\frac{2 b \sqrt{d (c^2 x^2+1)}\, f g x}{3 c \sqrt{c^2 x^2+1}}$$
$$+\frac{b \sqrt{d (c^2 x^2+1)}\, \operatorname{arcsinh}(c x)^2 f^2}{4 \sqrt{c^2 x^2+1}\, c}-\frac{b \sqrt{d (c^2 x^2+1)}\, \operatorname{arcsinh}(c x)^2 g^2}{16 \sqrt{c^2 x^2+1}\, c^3}-\frac{b \sqrt{d (c^2 x^2+1)}\, g^2}{128 c^3 \sqrt{c^2 x^2+1}}-\frac{b \sqrt{d (c^2 x^2+1)}\, f^2}{8 c \sqrt{c^2 x^2+1}}$$
$$+\frac{2 b \sqrt{d (c^2 x^2+1)}\, f g c^2 \operatorname{arcsinh}(c x) x^4}{3 (c^2 x^2+1)}+\frac{b \sqrt{d (c^2 x^2+1)}\, f^2 c^2 \operatorname{arcsinh}(c x) x^3}{2 (c^2 x^2+1)}-\frac{b \sqrt{d (c^2 x^2+1)}\, f^2 c x^2}{4 \sqrt{c^2 x^2+1}}+\frac{b \sqrt{d (c^2 x^2+1)}\, f^2 \operatorname{arcsinh}(c x) x}{2 (c^2 x^2+1)}$$
$$+\frac{b \sqrt{d (c^2 x^2+1)}\, g^2 c^2 \operatorname{arcsinh}(c x) x^5}{4 (c^2 x^2+1)}-\frac{b \sqrt{d (c^2 x^2+1)}\, g^2 c x^4}{16 \sqrt{c^2 x^2+1}}+\frac{3 b \sqrt{d (c^2 x^2+1)}\, g^2 \operatorname{arcsinh}(c x) x^3}{8 (c^2 x^2+1)}-\frac{b \sqrt{d (c^2 x^2+1)}\, g^2 x^2}{16 c \sqrt{c^2 x^2+1}}$$
$$+\frac{b \sqrt{d (c^2 x^2+1)}\, g^2 \operatorname{arcsinh}(c x) x}{8 c^2 (c^2 x^2+1)}+\frac{2 b \sqrt{d (c^2 x^2+1)}\, f g \operatorname{arcsinh}(c x)}{3 c^2 (c^2 x^2+1)}$$

Problem 18: Unable to integrate problem.

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

Optimal(type 4, 223 leaves, 9 steps):

$$\frac{m \operatorname{arcsinh}(c x)^2}{2 c}+\frac{\operatorname{arcsinh}(c x) \ln\left(h (g x+f)^m\right)}{c}-\frac{m \operatorname{arcsinh}(c x) \ln\left(1+\frac{\left(c x+\sqrt{c^2 x^2+1}\right) g}{c f-\sqrt{c^2 f^2+g^2}}\right)}{c}-\frac{m \operatorname{arcsinh}(c x) \ln\left(1+\frac{\left(c x+\sqrt{c^2 x^2+1}\right) g}{c f+\sqrt{c^2 f^2+g^2}}\right)}{c}$$

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

Result(type 8, 24 leaves):

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

Problem 24: Unable to integrate problem.

$$\int \frac{\operatorname{arcsinh}(bx+a)^3}{x^3}\,dx$$

Optimal(type 4, 550 leaves, 21 steps):

$$-\frac{3b^2\operatorname{arcsinh}(bx+a)^2}{2(a^2+1)}-\frac{\operatorname{arcsinh}(bx+a)^3}{2x^2}+\frac{3b^2\operatorname{arcsinh}(bx+a)\ln\left(1-\frac{bx+a+\sqrt{1+(bx+a)^2}}{a-\sqrt{a^2+1}}\right)}{a^2+1}$$
$$+\frac{3ab^2\operatorname{arcsinh}(bx+a)^2\ln\left(1-\frac{bx+a+\sqrt{1+(bx+a)^2}}{a-\sqrt{a^2+1}}\right)}{2(a^2+1)^{3/2}}+\frac{3b^2\operatorname{arcsinh}(bx+a)\ln\left(1-\frac{bx+a+\sqrt{1+(bx+a)^2}}{a+\sqrt{a^2+1}}\right)}{a^2+1}$$
$$-\frac{3ab^2\operatorname{arcsinh}(bx+a)^2\ln\left(1-\frac{bx+a+\sqrt{1+(bx+a)^2}}{a+\sqrt{a^2+1}}\right)}{2(a^2+1)^{3/2}}+\frac{3b^2\,\mathrm{polylog}\left(2, \frac{bx+a+\sqrt{1+(bx+a)^2}}{a-\sqrt{a^2+1}}\right)}{a^2+1}$$
$$+\frac{3ab^2\operatorname{arcsinh}(bx+a)\,\mathrm{polylog}\left(2, \frac{bx+a+\sqrt{1+(bx+a)^2}}{a-\sqrt{a^2+1}}\right)}{(a^2+1)^{3/2}}+\frac{3b^2\,\mathrm{polylog}\left(2, \frac{bx+a+\sqrt{1+(bx+a)^2}}{a+\sqrt{a^2+1}}\right)}{a^2+1}$$
$$-\frac{3ab^2\operatorname{arcsinh}(bx+a)\,\mathrm{polylog}\left(2, \frac{bx+a+\sqrt{1+(bx+a)^2}}{a+\sqrt{a^2+1}}\right)}{(a^2+1)^{3/2}}-\frac{3ab^2\,\mathrm{polylog}\left(3, \frac{bx+a+\sqrt{1+(bx+a)^2}}{a-\sqrt{a^2+1}}\right)}{(a^2+1)^{3/2}}$$
$$+\frac{3ab^2\,\mathrm{polylog}\left(3, \frac{bx+a+\sqrt{1+(bx+a)^2}}{a+\sqrt{a^2+1}}\right)}{(a^2+1)^{3/2}}-\frac{3b\operatorname{arcsinh}(bx+a)^2\sqrt{1+(bx+a)^2}}{2(a^2+1)x}$$

Result(type 8, 14 leaves):

$$\int \frac{\operatorname{arcsinh}(b x + a)^3}{x^3}\, dx$$

Problem 28: Unable to integrate problem.

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

Optimal(type 4, 92 leaves, 8 steps):

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

Result(type 8, 14 leaves):

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

Problem 29: Unable to integrate problem.

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

Optimal(type 4, 263 leaves, 16 steps):

$$- \frac{c\,(d x + c)\,\left(a + b \operatorname{arcsinh}(d x + c)\right)^{3/2}}{d^2} + \frac{\left(a + b \operatorname{arcsinh}(d x + c)\right)^{3/2} \cosh(2 \operatorname{arcsinh}(d x + c))}{4 d^2}$$
$$- \frac{3 b^{3/2} e^{\frac{2 a}{b}} \operatorname{erf}\left(\frac{\sqrt{2}\, \sqrt{a + b \operatorname{arcsinh}(d x + c)}}{\sqrt{b}}\right) \sqrt{2}\, \sqrt{\pi}}{128 d^2} + \frac{3 b^{3/2} \operatorname{erfi}\left(\frac{\sqrt{2}\, \sqrt{a + b \operatorname{arcsinh}(d x + c)}}{\sqrt{b}}\right) \sqrt{2}\, \sqrt{\pi}}{128 d^2\, e^{\frac{2 a}{b}}}$$
$$- \frac{3 b^{3/2} c\, e^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a + b \operatorname{arcsinh}(d x + c)}}{\sqrt{b}}\right) \sqrt{\pi}}{8 d^2} - \frac{3 b^{3/2} c \operatorname{erfi}\left(\frac{\sqrt{a + b \operatorname{arcsinh}(d x + c)}}{\sqrt{b}}\right) \sqrt{\pi}}{8 d^2\, e^{\frac{a}{b}}}$$
$$- \frac{3 b \sinh(2 \operatorname{arcsinh}(d x + c)) \sqrt{a + b \operatorname{arcsinh}(d x + c)}}{16 d^2} + \frac{3 b c \sqrt{1 + (d x + c)^2}\, \sqrt{a + b \operatorname{arcsinh}(d x + c)}}{2 d^2}$$

Result(type 8, 16 leaves):

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

Problem 30: Unable to integrate problem.

$$\int (a+b\operatorname{arcsinh}(dx+c))^{3/2}\,dx$$

Optimal(type 4, 121 leaves, 9 steps):

$$\frac{(dx+c)\,(a+b\operatorname{arcsinh}(dx+c))^{3/2}}{d}+\frac{3\,b^{3/2}\,e^{\frac{a}{b}}\,\operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{8\,d}+\frac{3\,b^{3/2}\operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{8\,d\,e^{\frac{a}{b}}}$$

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

Result(type 8, 14 leaves):

$$\int (a+b\operatorname{arcsinh}(dx+c))^{3/2}\,dx$$

Problem 31: Unable to integrate problem.

$$\int \frac{1}{(a+b\operatorname{arcsinh}(dx+c))^{7/2}}\,dx$$

Optimal(type 4, 158 leaves, 10 steps):

$$-\frac{4\,(dx+c)}{15\,b^2\,d\,(a+b\operatorname{arcsinh}(dx+c))^{3/2}}-\frac{4\,e^{\frac{a}{b}}\,\operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{15\,b^{7/2}\,d}+\frac{4\operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{15\,b^{7/2}\,d\,e^{\frac{a}{b}}}$$

$$-\frac{2\sqrt{1+(dx+c)^2}}{5\,b\,d\,(a+b\operatorname{arcsinh}(dx+c))^{5/2}}-\frac{8\sqrt{1+(dx+c)^2}}{15\,b^3\,d\sqrt{a+b\operatorname{arcsinh}(dx+c)}}$$

Result(type 8, 14 leaves):

$$\int \frac{1}{(a+b\operatorname{arcsinh}(dx+c))^{7/2}}\,dx$$

Problem 38: Unable to integrate problem.

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

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

$$\frac{(e\,(dx+c))^{1+m}\,(a+b\operatorname{arcsinh}(dx+c))^2}{d\,e\,(1+m)}-\frac{2\,b\,(e\,(dx+c))^{2+m}\,(a+b\operatorname{arcsinh}(dx+c))\operatorname{hypergeom}\left(\left[\frac{1}{2},1+\frac{m}{2}\right],\left[2+\frac{m}{2}\right],-(dx+c)^2\right)}{d\,e^2\,(1+m)\,(2+m)}$$

$$+\frac{2 b^2 (e (d x+c))^{3+m} \mathit{HypergeometricPFQ}\left(\left[1, \frac{3}{2}+\frac{m}{2}, \frac{3}{2}+\frac{m}{2}\right], \left[2+\frac{m}{2}, \frac{5}{2}+\frac{m}{2}\right], -(d x+c)^2\right)}{d e^3 (1+m) (2+m) (3+m)}$$

Result(type 8, 25 leaves):

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

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

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

Optimal(type 4, 179 leaves, 9 steps):

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

Result(type 4, 735 leaves):

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

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

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Problem 42: Result more than twice size of optimal antiderivative.
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$$\int (d e x + c e)^3 (a + b \operatorname{arcsinh}(d x + c))^4 \, dx$$

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Optimal(type 3, 319 leaves, 16 steps):
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$$- \frac{45 b^4 e^3 (d x + c)^2}{128 d} + \frac{3 b^4 e^3 (d x + c)^4}{128 d} - \frac{45 b^2 e^3 (a + b \operatorname{arcsinh}(d x + c))^2}{128 d} - \frac{9 b^2 e^3 (d x + c)^2 (a + b \operatorname{arcsinh}(d x + c))^2}{16 d}$$
$$+ \frac{3 b^2 e^3 (d x + c)^4 (a + b \operatorname{arcsinh}(d x + c))^2}{16 d} - \frac{3 e^3 (a + b \operatorname{arcsinh}(d x + c))^4}{32 d} + \frac{e^3 (d x + c)^4 (a + b \operatorname{arcsinh}(d x + c))^4}{4 d}$$
$$+ \frac{45 b^3 e^3 (d x + c) (a + b \operatorname{arcsinh}(d x + c)) \sqrt{1 + (d x + c)^2}}{64 d} - \frac{3 b^3 e^3 (d x + c)^3 (a + b \operatorname{arcsinh}(d x + c)) \sqrt{1 + (d x + c)^2}}{32 d}$$
$$+ \frac{3 b e^3 (d x + c) (a + b \operatorname{arcsinh}(d x + c))^3 \sqrt{1 + (d x + c)^2}}{8 d} - \frac{b e^3 (d x + c)^3 (a + b \operatorname{arcsinh}(d x + c))^3 \sqrt{1 + (d x + c)^2}}{4 d}$$

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Result(type 3, 682 leaves):
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$$\frac{1}{d} \Bigg(\frac{(d x + c)^4 e^3 a^4}{4} + e^3 b^4 \Bigg(\frac{(d x + c)^2 \operatorname{arcsinh}(d x + c)^4 \left(1 + (d x + c)^2\right)}{4} - \frac{\operatorname{arcsinh}(d x + c)^4 \left(1 + (d x + c)^2\right)}{4}$$
$$- \frac{\operatorname{arcsinh}(d x + c)^3 (d x + c) \left(1 + (d x + c)^2\right)^{3/2}}{4} + \frac{5 \operatorname{arcsinh}(d x + c)^3 \sqrt{1 + (d x + c)^2} (d x + c)}{8} + \frac{5 \operatorname{arcsinh}(d x + c)^4}{32}$$
$$+ \frac{3 (d x + c)^2 \left(1 + (d x + c)^2\right) \operatorname{arcsinh}(d x + c)^2}{16} - \frac{3 \operatorname{arcsinh}(d x + c) (d x + c) \left(1 + (d x + c)^2\right)^{3/2}}{32}$$
$$+ \frac{51 (d x + c) \operatorname{arcsinh}(d x + c) \sqrt{1 + (d x + c)^2}}{64} + \frac{51 \operatorname{arcsinh}(d x + c)^2}{128} + \frac{3 (d x + c)^2 \left(1 + (d x + c)^2\right)}{128} - \frac{3 \left(1 + (d x + c)^2\right) \operatorname{arcsinh}(d x + c)^2}{4}$$
$$- \frac{3 (d x + c)^2}{8} - \frac{3}{8} \Bigg) + 4 e^3 a b^3 \Bigg(\frac{(d x + c)^2 \operatorname{arcsinh}(d x + c)^3 \left(1 + (d x + c)^2\right)}{4} - \frac{\operatorname{arcsinh}(d x + c)^3 \left(1 + (d x + c)^2\right)}{4}$$
$$- \frac{3 \operatorname{arcsinh}(d x + c)^2 (d x + c) \left(1 + (d x + c)^2\right)^{3/2}}{16} + \frac{15 (d x + c) \operatorname{arcsinh}(d x + c)^2 \sqrt{1 + (d x + c)^2}}{32} + \frac{5 \operatorname{arcsinh}(d x + c)^3}{32}$$
$$+ \frac{3 \operatorname{arcsinh}(d x + c) (d x + c)^2 \left(1 + (d x + c)^2\right)}{32} - \frac{3 (d x + c) \left(1 + (d x + c)^2\right)^{3/2}}{128} + \frac{51 (d x + c) \sqrt{1 + (d x + c)^2}}{256} + \frac{51 \operatorname{arcsinh}(d x + c)}{256}$$

$$- \frac{3\left(1+(dx+c)^2\right)\operatorname{arcsinh}(dx+c)}{8}\Bigg) + 6e^3a^2b^2\Bigg(\frac{(dx+c)^2\left(1+(dx+c)^2\right)\operatorname{arcsinh}(dx+c)^2}{4} - \frac{\left(1+(dx+c)^2\right)\operatorname{arcsinh}(dx+c)^2}{4}$$

$$- \frac{\operatorname{arcsinh}(dx+c)\ (dx+c)\ \left(1+(dx+c)^2\right)^{3/2}}{8} + \frac{5\ (dx+c)\operatorname{arcsinh}(dx+c)\sqrt{1+(dx+c)^2}}{16} + \frac{5\operatorname{arcsinh}(dx+c)^2}{32}$$

$$+ \frac{(dx+c)^2\left(1+(dx+c)^2\right)}{32} - \frac{(dx+c)^2}{8} - \frac{1}{8}\Bigg) + 4e^3a^3b\Bigg(\frac{(dx+c)^4\operatorname{arcsinh}(dx+c)}{4} - \frac{(dx+c)^3\sqrt{1+(dx+c)^2}}{16}$$

$$+ \frac{3\ (dx+c)\sqrt{1+(dx+c)^2}}{32} - \frac{3\operatorname{arcsinh}(dx+c)}{32}\Bigg)\Bigg)$$

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

$$\int (dex+ce)^2\ (a+b\operatorname{arcsinh}(dx+c))^4\ dx$$

Optimal(type 3, 255 leaves, 13 steps):

$$-\frac{160b^4e^2x}{27} + \frac{8b^4e^2\ (dx+c)^3}{81d} - \frac{8b^2e^2\ (dx+c)\ (a+b\operatorname{arcsinh}(dx+c))^2}{3d} + \frac{4b^2e^2\ (dx+c)^3\ (a+b\operatorname{arcsinh}(dx+c))^2}{9d}$$

$$+ \frac{e^2\ (dx+c)^3\ (a+b\operatorname{arcsinh}(dx+c))^4}{3d} + \frac{160b^3e^2\ (a+b\operatorname{arcsinh}(dx+c))\sqrt{1+(dx+c)^2}}{27d}$$

$$- \frac{8b^3e^2\ (dx+c)^2\ (a+b\operatorname{arcsinh}(dx+c))\sqrt{1+(dx+c)^2}}{27d} + \frac{8be^2\ (a+b\operatorname{arcsinh}(dx+c))^3\sqrt{1+(dx+c)^2}}{9d}$$

$$- \frac{4be^2\ (dx+c)^2\ (a+b\operatorname{arcsinh}(dx+c))^3\sqrt{1+(dx+c)^2}}{9d}$$

Result(type 3, 566 leaves):

$$\frac{1}{d}\Bigg(\frac{(dx+c)^3e^2a^4}{3} + e^2b^4\Bigg(\frac{(dx+c)\operatorname{arcsinh}(dx+c)^4\left(1+(dx+c)^2\right)}{3} - \frac{\operatorname{arcsinh}(dx+c)^4\ (dx+c)}{3}$$

$$- \frac{4\ (dx+c)^2\operatorname{arcsinh}(dx+c)^3\sqrt{1+(dx+c)^2}}{9} + \frac{8\operatorname{arcsinh}(dx+c)^3\sqrt{1+(dx+c)^2}}{9} + \frac{4\operatorname{arcsinh}(dx+c)^2\ (dx+c)\ \left(1+(dx+c)^2\right)}{9}$$

$$- \frac{28\ (dx+c)\operatorname{arcsinh}(dx+c)^2}{9} - \frac{8\operatorname{arcsinh}(dx+c)\ (dx+c)^2\sqrt{1+(dx+c)^2}}{27} + \frac{160\operatorname{arcsinh}(dx+c)\sqrt{1+(dx+c)^2}}{27}$$

$$+ \frac{8\ (dx+c)\ \left(1+(dx+c)^2\right)}{81} - \frac{488dx}{81} - \frac{488c}{81}\Bigg) + 4e^2ab^3\Bigg(\frac{\operatorname{arcsinh}(dx+c)^3\ (dx+c)\ \left(1+(dx+c)^2\right)}{3} - \frac{\operatorname{arcsinh}(dx+c)^3\ (dx+c)}{3}$$

$$- \frac{\operatorname{arcsinh}(dx+c)^2\ (dx+c)^2\sqrt{1+(dx+c)^2}}{3} + \frac{2\operatorname{arcsinh}(dx+c)^2\sqrt{1+(dx+c)^2}}{3} + \frac{2\operatorname{arcsinh}(dx+c)\ (dx+c)\ \left(1+(dx+c)^2\right)}{9}$$

$$- \frac{14\operatorname{arcsinh}(dx+c)\ (dx+c)}{9} - \frac{2\ (dx+c)^2\sqrt{1+(dx+c)^2}}{27} + \frac{40\sqrt{1+(dx+c)^2}}{27}\Bigg) + 6e^2a^2b^2\Bigg(\frac{\operatorname{arcsinh}(dx+c)^2\ (dx+c)\ \left(1+(dx+c)^2\right)}{3}$$

$$-\frac{(dx+c)\,\mathrm{arcsinh}(dx+c)^2}{3}-\frac{2\,\mathrm{arcsinh}(dx+c)\,(dx+c)^2\sqrt{1+(dx+c)^2}}{9}+\frac{4\,\mathrm{arcsinh}(dx+c)\sqrt{1+(dx+c)^2}}{9}+\frac{2\,(dx+c)\left(1+(dx+c)^2\right)}{27}$$
$$-\frac{14\,dx}{27}-\frac{14\,c}{27}\Bigg)+4\,e^2\,a^3\,b\left(\frac{(dx+c)^3\,\mathrm{arcsinh}(dx+c)}{3}-\frac{(dx+c)^2\sqrt{1+(dx+c)^2}}{9}+\frac{2\sqrt{1+(dx+c)^2}}{9}\right)\Bigg)$$

Problem 44: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\mathrm{arcsinh}(dx+c))^4}{(dex+ce)^2}\,dx$$

Optimal(type 4, 299 leaves, 13 steps):

$$-\frac{(a+b\,\mathrm{arcsinh}(dx+c))^4}{d\,e^2\,(dx+c)}-\frac{8\,b\,(a+b\,\mathrm{arcsinh}(dx+c))^3\,\mathrm{arctanh}\left(dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$-\frac{12\,b^2\,(a+b\,\mathrm{arcsinh}(dx+c))^2\,\mathrm{polylog}\left(2,-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}+\frac{12\,b^2\,(a+b\,\mathrm{arcsinh}(dx+c))^2\,\mathrm{polylog}\left(2,dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$+\frac{24\,b^3\,(a+b\,\mathrm{arcsinh}(dx+c))\,\mathrm{polylog}\left(3,-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}-\frac{24\,b^3\,(a+b\,\mathrm{arcsinh}(dx+c))\,\mathrm{polylog}\left(3,dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$-\frac{24\,b^4\,\mathrm{polylog}\left(4,-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}+\frac{24\,b^4\,\mathrm{polylog}\left(4,dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$

Result(type 4, 819 leaves):

$$-\frac{a^4}{d\,e^2\,(dx+c)}-\frac{b^4\,\mathrm{arcsinh}(dx+c)^4}{d\,e^2\,(dx+c)}-\frac{4\,b^4\,\mathrm{arcsinh}(dx+c)^3\ln\left(1+dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$-\frac{12\,b^4\,\mathrm{arcsinh}(dx+c)^2\,\mathrm{polylog}\left(2,-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}+\frac{24\,b^4\,\mathrm{arcsinh}(dx+c)\,\mathrm{polylog}\left(3,-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$-\frac{24\,b^4\,\mathrm{polylog}\left(4,-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}+\frac{4\,b^4\,\mathrm{arcsinh}(dx+c)^3\ln\left(1-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$+\frac{12\,b^4\,\mathrm{arcsinh}(dx+c)^2\,\mathrm{polylog}\left(2,dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}-\frac{24\,b^4\,\mathrm{arcsinh}(dx+c)\,\mathrm{polylog}\left(3,dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$+\frac{24\,b^4\,\mathrm{polylog}\left(4,dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}-\frac{4\,a\,b^3\,\mathrm{arcsinh}(dx+c)^3}{d\,e^2\,(dx+c)}+\frac{12\,a\,b^3\,\mathrm{arcsinh}(dx+c)^2\ln\left(1-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$+\frac{24\,a\,b^3\,\mathrm{arcsinh}(dx+c)\,\mathrm{polylog}\left(2,dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}-\frac{24\,a\,b^3\,\mathrm{polylog}\left(3,dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$
$$-\frac{12\,a\,b^3\,\mathrm{arcsinh}(dx+c)^2\ln\left(1+dx+c+\sqrt{1+(dx+c)^2}\right)}{d\,e^2}-\frac{24\,a\,b^3\,\mathrm{arcsinh}(dx+c)\,\mathrm{polylog}\left(2,-dx-c-\sqrt{1+(dx+c)^2}\right)}{d\,e^2}$$

$$+\frac{24 a b^3 \operatorname{polylog}\left(3, -d x-c-\sqrt{1+(d x+c)^2}\right)}{d e^2}-\frac{6 a^2 b^2 \operatorname{arcsinh}(d x+c)^2}{d e^2 (d x+c)}-\frac{12 a^2 b^2 \operatorname{arcsinh}(d x+c) \ln\left(1+d x+c+\sqrt{1+(d x+c)^2}\right)}{d e^2}$$

$$-\frac{12 a^2 b^2 \operatorname{polylog}\left(2, -d x-c-\sqrt{1+(d x+c)^2}\right)}{d e^2}+\frac{12 a^2 b^2 \operatorname{arcsinh}(d x+c) \ln\left(1-d x-c-\sqrt{1+(d x+c)^2}\right)}{d e^2}$$

$$+\frac{12 a^2 b^2 \operatorname{polylog}\left(2, d x+c+\sqrt{1+(d x+c)^2}\right)}{d e^2}-\frac{4 a^3 b \operatorname{arcsinh}(d x+c)}{d e^2 (d x+c)}-\frac{4 a^3 b \operatorname{arctanh}\left(\frac{1}{\sqrt{1+(d x+c)^2}}\right)}{d e^2}$$

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Problem 49: Unable to integrate problem.
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$$\int (d e x+c e)^2 (a+b \operatorname{arcsinh}(d x+c))^{3/2} \, dx$$

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Optimal(type 4, 265 leaves, 24 steps):
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$$\frac{e^2 (d x+c)^3 (a+b \operatorname{arcsinh}(d x+c))^{3/2}}{3 d}+\frac{b^{3/2} e^2 e^{\frac{3 a}{b}} \operatorname{erf}\left(\frac{\sqrt{3} \sqrt{a+b \operatorname{arcsinh}(d x+c)}}{\sqrt{b}}\right) \sqrt{3} \sqrt{\pi}}{288 d}$$

$$+\frac{b^{3/2} e^2 \operatorname{erfi}\left(\frac{\sqrt{3} \sqrt{a+b \operatorname{arcsinh}(d x+c)}}{\sqrt{b}}\right) \sqrt{3} \sqrt{\pi}}{288 d e^{\frac{3 a}{b}}}-\frac{3 b^{3/2} e^2 e^{\frac{a}{b}} \operatorname{erf}\left(\frac{\sqrt{a+b \operatorname{arcsinh}(d x+c)}}{\sqrt{b}}\right) \sqrt{\pi}}{32 d}$$

$$-\frac{3 b^{3/2} e^2 \operatorname{erfi}\left(\frac{\sqrt{a+b \operatorname{arcsinh}(d x+c)}}{\sqrt{b}}\right) \sqrt{\pi}}{32 d e^{\frac{a}{b}}}+\frac{b e^2 \sqrt{1+(d x+c)^2} \sqrt{a+b \operatorname{arcsinh}(d x+c)}}{3 d}$$

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

```
Result(type 8, 25 leaves):
```

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

```
Problem 50: Unable to integrate problem.
```

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

```
Optimal(type 4, 121 leaves, 9 steps):
```

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

```
Result(type 8, 14 leaves):
```

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

```
Problem 52: Unable to integrate problem.
```

$$\int (dex+ce)^2\,(a+b\operatorname{arcsinh}(dx+c))^{7/2}\,\mathrm{d}x$$

```
Optimal(type 4, 398 leaves, 35 steps):
```

$$-\frac{35\,b^2\,e^2\,(dx+c)\,(a+b\operatorname{arcsinh}(dx+c))^{3/2}}{18\,d}+\frac{35\,b^2\,e^2\,(dx+c)^3\,(a+b\operatorname{arcsinh}(dx+c))^{3/2}}{108\,d}+\frac{e^2\,(dx+c)^3\,(a+b\operatorname{arcsinh}(dx+c))^{7/2}}{3\,d}$$
$$+\frac{35\,b^{7/2}\,e^2\,\mathrm{e}^{\frac{3a}{b}}\,\operatorname{erf}\left(\frac{\sqrt{3}\,\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{3}\,\sqrt{\pi}}{10368\,d}+\frac{35\,b^{7/2}\,e^2\operatorname{erfi}\left(\frac{\sqrt{3}\,\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{3}\,\sqrt{\pi}}{10368\,d\,\mathrm{e}^{\frac{3a}{b}}}$$
$$-\frac{105\,b^{7/2}\,e^2\,\mathrm{e}^{\frac{a}{b}}\,\operatorname{erf}\left(\frac{\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{128\,d}-\frac{105\,b^{7/2}\,e^2\operatorname{erfi}\left(\frac{\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{128\,d\,\mathrm{e}^{\frac{a}{b}}}$$
$$+\frac{7\,b\,e^2\,(a+b\operatorname{arcsinh}(dx+c))^{5/2}\sqrt{1+(dx+c)^2}}{9\,d}-\frac{7\,b\,e^2\,(dx+c)^2\,(a+b\operatorname{arcsinh}(dx+c))^{5/2}\sqrt{1+(dx+c)^2}}{18\,d}$$
$$+\frac{175\,b^3\,e^2\sqrt{1+(dx+c)^2}\,\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{54\,d}-\frac{35\,b^3\,e^2\,(dx+c)^2\sqrt{1+(dx+c)^2}\,\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{216\,d}$$

```
Result(type 8, 25 leaves):
```

$$\int (dex+ce)^2\,(a+b\operatorname{arcsinh}(dx+c))^{7/2}\,\mathrm{d}x$$

```
Problem 53: Unable to integrate problem.
```

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

Optimal(type 4, 171 leaves, 15 steps):

$$\frac{e^3\,\mathrm{e}^{\frac{2a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{2}\,\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{2}\,\sqrt{\pi}}{16\,d\sqrt{b}} - \frac{e^3\,\mathrm{erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{2}\,\sqrt{\pi}}{16\,d\,\mathrm{e}^{\frac{2a}{b}}\sqrt{b}} - \frac{e^3\,\mathrm{e}^{\frac{4a}{b}}\,\mathrm{erf}\left(\frac{2\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{32\,d\sqrt{b}} + \frac{e^3\,\mathrm{erfi}\left(\frac{2\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{32\,d\,\mathrm{e}^{\frac{4a}{b}}\sqrt{b}}$$

Result(type 8, 25 leaves):

$$\int \frac{(dex+ce)^3}{\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}\,dx$$

Problem 54: Unable to integrate problem.

$$\int \frac{dex+ce}{\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}\,dx$$

Optimal(type 4, 87 leaves, 10 steps):

$$-\frac{e\,\mathrm{e}^{\frac{2a}{b}}\,\mathrm{erf}\left(\frac{\sqrt{2}\,\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{2}\,\sqrt{\pi}}{8\,d\sqrt{b}} + \frac{e\,\mathrm{erfi}\left(\frac{\sqrt{2}\,\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{2}\,\sqrt{\pi}}{8\,d\,\mathrm{e}^{\frac{2a}{b}}\sqrt{b}}$$

Result(type 8, 23 leaves):

$$\int \frac{dex+ce}{\sqrt{a+b\,\mathrm{arcsinh}(dx+c)}}\,dx$$

Problem 55: Unable to integrate problem.

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

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

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

Result(type 8, 14 leaves):

$$\int \frac{1}{\sqrt{a+b\,\mathrm{arcsinh}(d x+c)}}\, dx$$

Problem 56: Unable to integrate problem.

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

Optimal(type 4, 272 leaves, 26 steps):

$$-\frac{2 e^3 \mathrm{e}^{\frac{4 a}{b}} \operatorname{erf}\left(\frac{2\sqrt{a+b\,\mathrm{arcsinh}(d x+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{3 b^{5/2} d}+\frac{2 e^3 \operatorname{erfi}\left(\frac{2\sqrt{a+b\,\mathrm{arcsinh}(d x+c)}}{\sqrt{b}}\right)\sqrt{\pi}}{3 b^{5/2} d\, \mathrm{e}^{\frac{4 a}{b}}}+\frac{e^3 \mathrm{e}^{\frac{2 a}{b}} \operatorname{erf}\left(\frac{\sqrt{2}\sqrt{a+b\,\mathrm{arcsinh}(d x+c)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{3 b^{5/2} d}$$
$$-\frac{e^3 \operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\,\mathrm{arcsinh}(d x+c)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{3 b^{5/2} d\, \mathrm{e}^{\frac{2 a}{b}}}-\frac{2 e^3 (d x+c)^3\sqrt{1+(d x+c)^2}}{3 b d\,(a+b\,\mathrm{arcsinh}(d x+c))^{3/2}}-\frac{4 e^3 (d x+c)^2}{b^2 d\sqrt{a+b\,\mathrm{arcsinh}(d x+c)}}$$
$$-\frac{16 e^3 (d x+c)^4}{3 b^2 d\sqrt{a+b\,\mathrm{arcsinh}(d x+c)}}$$

Result(type 8, 25 leaves):

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

Problem 57: Unable to integrate problem.

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

Optimal(type 4, 127 leaves, 9 steps):

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

Result(type 8, 14 leaves):

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

Problem 59: Unable to integrate problem.

$$\int \frac{dex+ce}{(a+b\operatorname{arcsinh}(dx+c))^{7/2}}\,dx$$

Optimal(type 4, 210 leaves, 11 steps):

$$-\frac{4e}{15b^2d(a+b\operatorname{arcsinh}(dx+c))^{3/2}}-\frac{8e(dx+c)^2}{15b^2d(a+b\operatorname{arcsinh}(dx+c))^{3/2}}+\frac{8e\,\mathrm{e}^{\frac{2a}{b}}\operatorname{erf}\left(\frac{\sqrt{2}\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{15b^{7/2}d}$$
$$+\frac{8e\operatorname{erfi}\left(\frac{\sqrt{2}\sqrt{a+b\operatorname{arcsinh}(dx+c)}}{\sqrt{b}}\right)\sqrt{2}\sqrt{\pi}}{15b^{7/2}d\,\mathrm{e}^{\frac{2a}{b}}}-\frac{2e(dx+c)\sqrt{1+(dx+c)^2}}{5bd(a+b\operatorname{arcsinh}(dx+c))^{5/2}}-\frac{32e(dx+c)\sqrt{1+(dx+c)^2}}{15b^3d\sqrt{a+b\operatorname{arcsinh}(dx+c)}}$$

Result(type 8, 23 leaves):

$$\int \frac{dex+ce}{(a+b\operatorname{arcsinh}(dx+c))^{7/2}}\,dx$$

Problem 64: Unable to integrate problem.

$$\int (dex+ce)^{3/2}(a+b\operatorname{arcsinh}(dx+c))^2\,dx$$

Optimal(type 5, 110 leaves, 3 steps):

$$\frac{2(e(dx+c))^{5/2}(a+b\operatorname{arcsinh}(dx+c))^2}{5de}-\frac{8b(e(dx+c))^{7/2}(a+b\operatorname{arcsinh}(dx+c))\operatorname{hypergeom}\left(\left[\frac{1}{2},\frac{7}{4}\right],\left[\frac{11}{4}\right],-(dx+c)^2\right)}{35de^2}$$
$$+\frac{16b^2(e(dx+c))^{9/2}\,\mathit{HypergeometricPFQ}\left(\left[1,\frac{9}{4},\frac{9}{4}\right],\left[\frac{11}{4},\frac{13}{4}\right],-(dx+c)^2\right)}{315de^3}$$

Result(type 8, 25 leaves):

$$\int (dex+ce)^{3/2}(a+b\operatorname{arcsinh}(dx+c))^2\,dx$$

Problem 65: Unable to integrate problem.

$$\int (a+b\operatorname{arcsinh}(dx+c))^2\sqrt{dex+ce}\,dx$$

Optimal(type 5, 110 leaves, 3 steps):

$$\frac{2(e(dx+c))^{3/2}(a+b\operatorname{arcsinh}(dx+c))^2}{3de}-\frac{8b(e(dx+c))^{5/2}(a+b\operatorname{arcsinh}(dx+c))\operatorname{hypergeom}\left(\left[\frac{1}{2},\frac{5}{4}\right],\left[\frac{9}{4}\right],-(dx+c)^2\right)}{15de^2}$$

$$+\frac{16 b^2 (e (d x+c))^{7/2} HypergeometricPFQ\left(\left[1, \frac{7}{4}, \frac{7}{4}\right], \left[\frac{9}{4}, \frac{11}{4}\right], -(d x+c)^2\right)}{105 d e^3}$$

```
Result(type 8, 25 leaves):
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$$\int (a+b \operatorname{arcsinh}(d x+c))^2 \sqrt{d e x+c e}\, dx$$

```
Problem 66: Unable to integrate problem.
```

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

```
Optimal(type 5, 110 leaves, 3 steps):
```

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

```
Result(type 8, 25 leaves):
```

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

```
Problem 67: Unable to integrate problem.
```

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

```
Optimal(type 5, 110 leaves, 3 steps):
```

$$-\frac{2 (a+b \operatorname{arcsinh}(d x+c))^2}{5 d e (e (d x+c))^{5/2}}-\frac{8 b (a+b \operatorname{arcsinh}(d x+c)) \operatorname{hypergeom}\left(\left[-\frac{3}{4}, \frac{1}{2}\right], \left[\frac{1}{4}\right], -(d x+c)^2\right)}{15 d e^2 (e (d x+c))^{3/2}}$$
$$-\frac{16 b^2 HypergeometricPFQ\left(\left[-\frac{1}{4}, -\frac{1}{4}, 1\right], \left[\frac{1}{4}, \frac{3}{4}\right], -(d x+c)^2\right)}{15 d e^3 \sqrt{e (d x+c)}}$$

```
Result(type 8, 25 leaves):
```

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

```
Problem 73: Result more than twice size of optimal antiderivative.
```

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

Optimal(type 3, 165 leaves, 11 steps):

$$\frac{(b x + a) \left(1 + (b x + a)^2\right)^{3/2}}{32 b} - \frac{9 \operatorname{arcsinh}(b x + a)}{64 b} - \frac{3 (b x + a)^2 \operatorname{arcsinh}(b x + a)}{8 b} - \frac{\left(1 + (b x + a)^2\right)^2 \operatorname{arcsinh}(b x + a)}{8 b} + \frac{(b x + a) \left(1 + (b x + a)^2\right)^{3/2} \operatorname{arcsinh}(b x + a)^2}{4 b} + \frac{\operatorname{arcsinh}(b x + a)^3}{8 b} + \frac{15 (b x + a) \sqrt{1 + (b x + a)^2}}{64 b} + \frac{3 (b x + a) \operatorname{arcsinh}(b x + a)^2 \sqrt{1 + (b x + a)^2}}{8 b}$$

Result(type 3, 478 leaves):

$$\frac{1}{64 b} \Big(16 \operatorname{arcsinh}(b x + a)^2 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, x^3 b^3 - 8 \operatorname{arcsinh}(b x + a) x^4 b^4 + 48 \operatorname{arcsinh}(b x + a)^2 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, x^2 a b^2 - 32 \operatorname{arcsinh}(b x + a) x^3 a b^3 + 48 \operatorname{arcsinh}(b x + a)^2 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, x a^2 b + 2 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, x^3 b^3 - 48 \operatorname{arcsinh}(b x + a) x^2 a^2 b^2 + 16 \operatorname{arcsinh}(b x + a)^2 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, a^3 + 6 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, x^2 a b^2 - 32 \operatorname{arcsinh}(b x + a) x a^3 b + 40 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, \operatorname{arcsinh}(b x + a)^2 x b + 6 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, x a^2 b - 40 \operatorname{arcsinh}(b x + a) x^2 b^2 - 8 \operatorname{arcsinh}(b x + a) a^4 + 40 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, \operatorname{arcsinh}(b x + a)^2 a + 2 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, a^3 - 80 \operatorname{arcsinh}(b x + a) x a b + 17 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, x b + 8 \operatorname{arcsinh}(b x + a)^3 - 40 \operatorname{arcsinh}(b x + a) a^2 + 17 \sqrt{b^2 x^2 + 2 a b x + a^2 + 1}\, a - 17 \operatorname{arcsinh}(b x + a)\Big)$$

Problem 82: Unable to integrate problem.

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

Optimal(type 5, 53 leaves, 3 steps):

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

Result(type 8, 10 leaves):

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

Problem 83: Unable to integrate problem.

$$\int \frac{\operatorname{arcsinh}(a x^n)}{x^2} \, dx$$

Optimal(type 5, 57 leaves, 3 steps):

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

Result(type 8, 12 leaves):

$$\int \frac{\operatorname{arcsinh}(a x^n)}{x^2}\, dx$$

Problem 84: Unable to integrate problem.

$$\int \left(a + b \operatorname{arcsinh}(\mathrm{I} + d x^2)\right)^2 dx$$

Optimal(type 3, 69 leaves, 2 steps):

$$8 b^2 x + x \left(a - \mathrm{I} b \arcsin(-1 + \mathrm{I} d x^2)\right)^2 - \frac{4 b \left(a - \mathrm{I} b \arcsin(-1 + \mathrm{I} d x^2)\right) \sqrt{2 \mathrm{I} d x^2 + d^2 x^4}}{d x}$$

Result(type 8, 17 leaves):

$$\int \left(a + b \operatorname{arcsinh}(\mathrm{I} + d x^2)\right)^2 dx$$

Problem 85: Unable to integrate problem.

$$\int \frac{1}{\left(a + b \operatorname{arcsinh}(-\mathrm{I} + d x^2)\right)^3}\, dx$$

Optimal(type 4, 226 leaves, 2 steps):

$$-\frac{x}{8 b^2 \left(a - \mathrm{I} b \arcsin(1 + \mathrm{I} d x^2)\right)} + \frac{x \operatorname{Shi}\left(\frac{a - \mathrm{I} b \arcsin(1 + \mathrm{I} d x^2)}{2 b}\right) \left(\cosh\left(\frac{a}{2 b}\right) + \mathrm{I} \sinh\left(\frac{a}{2 b}\right)\right)}{16 b^3 \left(\cos\left(\frac{\arcsin(1 + \mathrm{I} d x^2)}{2}\right) - \sin\left(\frac{\arcsin(1 + \mathrm{I} d x^2)}{2}\right)\right)}$$

$$- \frac{x \operatorname{Ci}\left(\frac{\frac{\mathrm{I}}{2} \left(a - \mathrm{I} b \arcsin(1 + \mathrm{I} d x^2)\right)}{b}\right) \left(\mathrm{I} \cosh\left(\frac{a}{2 b}\right) + \sinh\left(\frac{a}{2 b}\right)\right)}{16 b^3 \left(\cos\left(\frac{\arcsin(1 + \mathrm{I} d x^2)}{2}\right) - \sin\left(\frac{\arcsin(1 + \mathrm{I} d x^2)}{2}\right)\right)} - \frac{\sqrt{-2 \mathrm{I} d x^2 + d^2 x^4}}{4 b d x \left(a - \mathrm{I} b \arcsin(1 + \mathrm{I} d x^2)\right)^2}$$

Result(type 8, 17 leaves):

$$\int \frac{1}{\left(a + b \operatorname{arcsinh}(-\mathrm{I} + d x^2)\right)^3}\, dx$$

Problem 86: Unable to integrate problem.

$$\int \sqrt{a + b \operatorname{arcsinh}(\mathrm{I} + d x^2)}\, dx$$

Optimal(type 4, 205 leaves, 1 step):

$$\frac{x\,\mathrm{FresnelS}\left(\frac{\sqrt{\frac{-I}{b}}\,\sqrt{a-I\,b\arcsin(-1+I\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)+I\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\left(\cos\left(\frac{\arcsin(-1+I\,d\,x^2)}{2}\right)+\sin\left(\frac{\arcsin(-1+I\,d\,x^2)}{2}\right)\right)\sqrt{\frac{-I}{b}}}$$

$$-\frac{b\,x\,\mathrm{FresnelC}\left(\frac{\sqrt{\frac{-I}{b}}\,\sqrt{a-I\,b\arcsin(-1+I\,d\,x^2)}}{\sqrt{\pi}}\right)\left(I\cosh\left(\frac{a}{2\,b}\right)+\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\frac{-I}{b}}\,\sqrt{\pi}}{\cos\left(\frac{\arcsin(-1+I\,d\,x^2)}{2}\right)+\sin\left(\frac{\arcsin(-1+I\,d\,x^2)}{2}\right)}+x\sqrt{a-I\,b\arcsin(-1+I\,d\,x^2)}$$

Result(type 8, 17 leaves):

$$\int\sqrt{a+b\,\mathrm{arcsinh}(I+d\,x^2)}\,dx$$

Problem 87: Unable to integrate problem.

$$\int\frac{1}{(a+b\,\mathrm{arcsinh}(I+d\,x^2))^{3/2}}\,dx$$

Optimal(type 4, 230 leaves, 1 step):

$$-\frac{\left(\frac{-I}{b}\right)^{3/2}x\,\mathrm{FresnelC}\left(\frac{\sqrt{\frac{-I}{b}}\,\sqrt{a-I\,b\arcsin(-1+I\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)-I\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\cos\left(\frac{\arcsin(-1+I\,d\,x^2)}{2}\right)+\sin\left(\frac{\arcsin(-1+I\,d\,x^2)}{2}\right)}$$

$$+\frac{\left(\frac{-I}{b}\right)^{3/2}x\,\mathrm{FresnelS}\left(\frac{\sqrt{\frac{-I}{b}}\,\sqrt{a-I\,b\arcsin(-1+I\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)+I\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\cos\left(\frac{\arcsin(-1+I\,d\,x^2)}{2}\right)+\sin\left(\frac{\arcsin(-1+I\,d\,x^2)}{2}\right)}-\frac{\sqrt{2\,I\,d\,x^2+d^2\,x^4}}{b\,d\,x\sqrt{a-I\,b\arcsin(-1+I\,d\,x^2)}}$$

Result(type 8, 17 leaves):

$$\int\frac{1}{(a+b\,\mathrm{arcsinh}(I+d\,x^2))^{3/2}}\,dx$$

Problem 88: Unable to integrate problem.

$$\int\frac{1}{(a+b\,\mathrm{arcsinh}(I+d\,x^2))^{5/2}}\,dx$$

Optimal(type 4, 253 leaves, 2 steps):

$$-\frac{x\,\mathrm{FresnelS}\left(\frac{\sqrt{a-\mathrm{I}\,b\arcsin(-1+\mathrm{I}\,d\,x^2)}}{\sqrt{\mathrm{I}\,b}\,\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)-\mathrm{I}\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{3\,b^2\left(\cos\left(\frac{\arcsin(-1+\mathrm{I}\,d\,x^2)}{2}\right)+\sin\left(\frac{\arcsin(-1+\mathrm{I}\,d\,x^2)}{2}\right)\right)\sqrt{\mathrm{I}\,b}}$$

$$-\frac{x\,\mathrm{FresnelC}\left(\frac{\sqrt{a-\mathrm{I}\,b\arcsin(-1+\mathrm{I}\,d\,x^2)}}{\sqrt{\mathrm{I}\,b}\,\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)+\mathrm{I}\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{3\,b^2\left(\cos\left(\frac{\arcsin(-1+\mathrm{I}\,d\,x^2)}{2}\right)+\sin\left(\frac{\arcsin(-1+\mathrm{I}\,d\,x^2)}{2}\right)\right)\sqrt{\mathrm{I}\,b}}-\frac{\sqrt{2\,\mathrm{I}\,d\,x^2+d^2\,x^4}}{3\,b\,d\,x\,(a-\mathrm{I}\,b\arcsin(-1+\mathrm{I}\,d\,x^2))^{3/2}}$$

$$-\frac{x}{3\,b^2\sqrt{a-\mathrm{I}\,b\arcsin(-1+\mathrm{I}\,d\,x^2)}}$$

Result(type 8, 17 leaves):

$$\int\frac{1}{(a+b\,\mathrm{arcsinh}(\mathrm{I}+d\,x^2))^{5/2}}\,\mathrm{d}x$$

Problem 89: Unable to integrate problem.

$$\int(a+b\,\mathrm{arcsinh}(-\mathrm{I}+d\,x^2))^{5/2}\,\mathrm{d}x$$

Optimal(type 4, 283 leaves, 2 steps):

$$x\,(a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2))^{5/2}+\frac{15\,b^2\,x\,\mathrm{FresnelS}\left(\frac{\sqrt{\frac{\mathrm{I}}{b}}\,\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)-\mathrm{I}\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\left(\cos\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)-\sin\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)\right)\sqrt{\frac{\mathrm{I}}{b}}}$$

$$-\frac{15\,b^2\,x\,\mathrm{FresnelC}\left(\frac{\sqrt{\frac{\mathrm{I}}{b}}\,\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)+\mathrm{I}\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\left(\cos\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)-\sin\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)\right)\sqrt{\frac{\mathrm{I}}{b}}}-\frac{5\,b\,(a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2))^{3/2}\sqrt{-2\,\mathrm{I}\,d\,x^2+d^2\,x^4}}{d\,x}$$

$$+15\,b^2\,x\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}$$

Result(type 8, 17 leaves):

$$\int(a+b\,\mathrm{arcsinh}(-\mathrm{I}+d\,x^2))^{5/2}\,\mathrm{d}x$$

Problem 90: Unable to integrate problem.

$$\int \sqrt{a+b\,\mathrm{arcsinh}(-\mathrm{I}+d\,x^2)}\,\mathrm{d}x$$

Optimal(type 4, 208 leaves, 1 step):

$$\frac{x\,\mathrm{FresnelS}\left(\frac{\sqrt{\frac{\mathrm{I}}{b}}\,\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)-\mathrm{I}\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\left(\cos\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)-\sin\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)\right)\sqrt{\frac{\mathrm{I}}{b}}}$$

$$-\frac{x\,\mathrm{FresnelC}\left(\frac{\sqrt{\frac{\mathrm{I}}{b}}\,\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)+\mathrm{I}\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\left(\cos\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)-\sin\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)\right)\sqrt{\frac{\mathrm{I}}{b}}}+x\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}$$

Result(type 8, 17 leaves):

$$\int \sqrt{a+b\,\mathrm{arcsinh}(-\mathrm{I}+d\,x^2)}\,\mathrm{d}x$$

Problem 91: Unable to integrate problem.

$$\int \frac{1}{\left(a+b\,\mathrm{arcsinh}(-\mathrm{I}+d\,x^2)\right)^{3/2}}\,\mathrm{d}x$$

Optimal(type 4, 234 leaves, 1 step):

$$\frac{\left(\frac{\mathrm{I}}{b}\right)^{3/2}x\,\mathrm{FresnelS}\left(\frac{\sqrt{\frac{\mathrm{I}}{b}}\,\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)-\mathrm{I}\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\cos\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)-\sin\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)}$$

$$-\frac{\left(\frac{\mathrm{I}}{b}\right)^{3/2}x\,\mathrm{FresnelC}\left(\frac{\sqrt{\frac{\mathrm{I}}{b}}\,\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}}{\sqrt{\pi}}\right)\left(\cosh\left(\frac{a}{2\,b}\right)+\mathrm{I}\sinh\left(\frac{a}{2\,b}\right)\right)\sqrt{\pi}}{\cos\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)-\sin\left(\frac{\arcsin(1+\mathrm{I}\,d\,x^2)}{2}\right)}-\frac{\sqrt{-2\,\mathrm{I}\,d\,x^2+d^2\,x^4}}{b\,d\,x\sqrt{a-\mathrm{I}\,b\arcsin(1+\mathrm{I}\,d\,x^2)}}$$

Result(type 8, 17 leaves):

$$\int \frac{1}{\left(a+b\,\mathrm{arcsinh}(-\mathrm{I}+d\,x^2)\right)^{3/2}}\,\mathrm{d}x$$

Problem 92: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 285 leaves, 8 steps):

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

Result(type 4, 1174 leaves):

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

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

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

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

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

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

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

Problem 97: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 91 leaves, 9 steps):

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

Result(type 3, 266 leaves):

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

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

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

Problem 100: Unable to integrate problem.

$$\int\frac{x}{\operatorname{arcsinh}(\sinh(x))}\,\mathrm{d}x$$

Optimal(type 3, 25 leaves, ? steps):

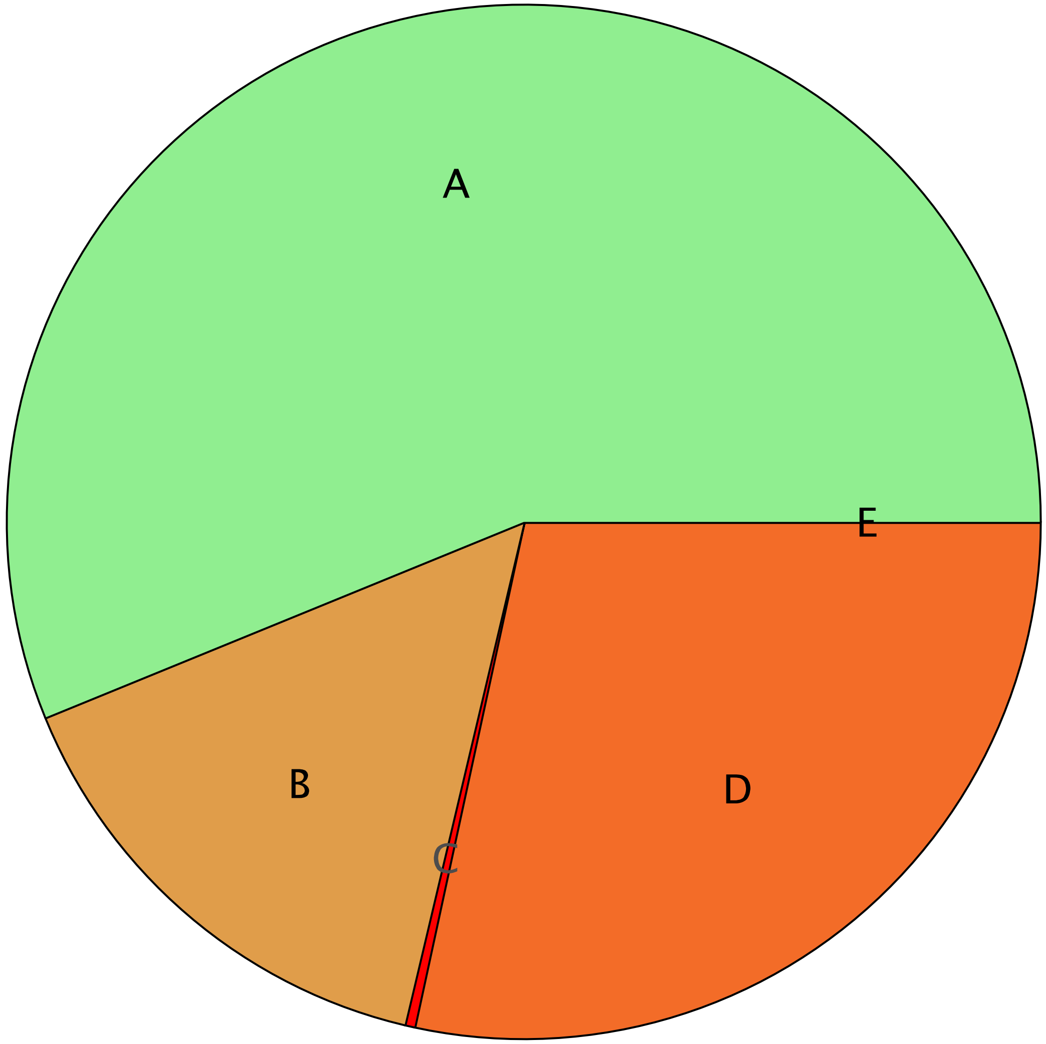
$$\operatorname{arcsinh}(\sinh(x))+\ln(\operatorname{arcsinh}(\sinh(x)))\left(-\operatorname{arcsinh}(\sinh(x))+x\operatorname{sech}(x)\sqrt{\cosh(x)^2}\right)$$

Result(type 8, 9 leaves):

$$\int\frac{x}{\operatorname{arcsinh}(\sinh(x))}\,\mathrm{d}x$$

Summary of Integration Test Results

324 integration problems



A - 182 optimal antiderivatives
B - 49 more than twice size of optimal antiderivatives
C - 1 unnecessarily complex antiderivatives
D - 92 unable to integrate problems
E - 0 integration timeouts