Mathematica 11.3 Integration Test Results

on the problems in the test-suite directory "7 Inverse hyperbolic functions\7.3 Inverse hyperbolic tangent"

Test results for the 243 problems in "7.3.2 (d x)^m (a+b arctanh(c x^n))^p.m"

Problem 19: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 117 leaves, 6 steps):

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

Result (type 4, 151 leaves):

$$a^2\,\text{Log}[c\,x]+a\,b\,(-\text{PolyLog}[2,-c\,x]+\text{PolyLog}[2,c\,x])+b^2\left(\frac{i\,\pi^3}{24}-\frac{2}{3}\text{ArcTanh}[c\,x]^3-\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]+\frac{1}{2}\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}[c\,x]}\right]-\frac{1}{2}\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)$$

Problem 30: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 184 leaves, 8 steps):

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

Result (type 4, 315 leaves):

$$a^3\,\text{Log}[c\,x]+\frac{3}{2}\,a^2\,b\,(-\text{PolyLog}[2,-c\,x]+\text{PolyLog}[2,c\,x])+3\,a\,b^2\left(\frac{i\,\pi^3}{24}-\frac{2}{3}\,\text{ArcTanh}[c\,x]^3-\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]+\frac{1}{2}\,\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}[c\,x]}\right]-\frac{1}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)+\frac{1}{64}\,b^3\left(\pi^4-32\,\text{ArcTanh}[c\,x]^4-64\,\text{ArcTanh}[c\,x]^3\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c\,x]}\right]+64\,\text{ArcTanh}[c\,x]^3\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]+96\,\text{ArcTanh}[c\,x]^2\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c\,x]}\right]+96\,\text{ArcTanh}[c\,x]^2\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]+96\,\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}[c\,x]}\right]-96\,\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]+48\,\text{PolyLog}\left[4,-e^{-2\,\text{ArcTanh}[c\,x]}\right]+48\,\text{PolyLog}\left[4,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)$$

Problem 31: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 102 leaves, 5 steps):

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

Result (type 4, 196 leaves):

$$-\frac{a^3}{x}-\frac{3\,a^2\,b\,\text{ArcTanh}[c\,x]}{x}+3\,a^2\,b\,c\,\text{Log}[x]-\frac{3}{2}\,a^2\,b\,c\,\text{Log}\left[1-c^2\,x^2\right]+3\,a\,b^2\,c\left(\text{ArcTanh}[c\,x]\left(\text{ArcTanh}[c\,x]-\frac{\text{ArcTanh}[c\,x]}{c\,x}+2\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)-\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)+b^3\,c\left(\frac{i\,\pi^3}{8}-\text{ArcTanh}[c\,x]^3-\frac{\text{ArcTanh}[c\,x]^3}{c\,x}+3\,\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]+3\,\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]-\frac{3}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)$$

Problem 33: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a+b\,\text{ArcTanh}[c\,x])^3}{x^4}\,dx$$

Optimal (type 4, 200 leaves, 14 steps):

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

Result (type 4, 323 leaves):

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

Problem 68: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 137 leaves, 7 steps):

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

Result (type 4, 181 leaves):

$$a^2\,\text{Log}[x]+\frac{1}{2}\,a\,b\,\left(-\text{PolyLog}\left[2,-c\,x^2\right]+\text{PolyLog}\left[2,c\,x^2\right]\right)+$$
$$\frac{1}{2}\,b^2\left(\frac{i\,\pi^3}{24}-\frac{2}{3}\,\text{ArcTanh}\left[c\,x^2\right]^3-\text{ArcTanh}\left[c\,x^2\right]^2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}\left[c\,x^2\right]}\right]+\text{ArcTanh}\left[c\,x^2\right]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[c\,x^2\right]}\right]+\text{ArcTanh}\left[c\,x^2\right]\right.$$
$$\left.\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}\left[c\,x^2\right]}\right]+\text{ArcTanh}\left[c\,x^2\right]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}\left[c\,x^2\right]}\right]+\frac{1}{2}\,\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}\left[c\,x^2\right]}\right]-\frac{1}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}\left[c\,x^2\right]}\right]\right)$$

Problem 71: Unable to integrate problem.

$$\int x^4\,\left(a+b\,\text{ArcTanh}\left[c\,x^2\right]\right)^2\,dx$$

Optimal (type 4, 1173 leaves, 102 steps):

$$\frac{8\,b^2\,x}{15\,c^2}+\frac{2\,a\,b\,x^3}{15\,c}-\frac{2}{25}\,a\,b\,x^5+\frac{2\,a\,b\,\text{ArcTan}\left[\sqrt{c}\,x\right]}{5\,c^{5/2}}-\frac{4\,b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]}{15\,c^{5/2}}+\frac{i\,b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]^2}{5\,c^{5/2}}-\frac{4\,b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]}{15\,c^{5/2}}-$$
$$\frac{b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]^2}{5\,c^{5/2}}+\frac{2\,b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2}{1-\sqrt{c}\,x}\right]}{5\,c^{5/2}}-\frac{2\,b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2}{1-i\,\sqrt{c}\,x}\right]}{5\,c^{5/2}}+\frac{b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{(1+i)\,\left(1-\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]}{5\,c^{5/2}}+$$
$$\frac{2\,b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2}{1+i\,\sqrt{c}\,x}\right]}{5\,c^{5/2}}-\frac{2\,b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2}{1+\sqrt{c}\,x}\right]}{5\,c^{5/2}}+\frac{b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[-\frac{2\,\sqrt{c}\,\left(1-\sqrt{-c}\,x\right)}{\left(\sqrt{-c}-\sqrt{c}\right)\,\left(1+\sqrt{c}\,x\right)}\right]}{5\,c^{5/2}}+$$
$$\frac{b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2\,\sqrt{c}\,\left(1+\sqrt{-c}\,x\right)}{\left(\sqrt{-c}+\sqrt{c}\right)\,\left(1+\sqrt{c}\,x\right)}\right]}{5\,c^{5/2}}+\frac{b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{(1-i)\,\left(1+\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]}{5\,c^{5/2}}-\frac{b^2\,x^3\,\text{Log}\left[1-c\,x^2\right]}{15\,c}+\frac{1}{25}\,b^2\,x^5\,\text{Log}\left[1-c\,x^2\right]-$$
$$\frac{b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1-c\,x^2\right]}{5\,c^{5/2}}+\frac{b\,x^3\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)}{15\,c}+\frac{1}{25}\,b\,x^5\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)-\frac{b\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)}{5\,c^{5/2}}+$$
$$\frac{1}{20}\,x^5\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)^2+\frac{2\,b^2\,x^3\,\text{Log}\left[1+c\,x^2\right]}{15\,c}+\frac{1}{5}\,a\,b\,x^5\,\text{Log}\left[1+c\,x^2\right]+\frac{b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1+c\,x^2\right]}{5\,c^{5/2}}-$$
$$\frac{b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1+c\,x^2\right]}{5\,c^{5/2}}-\frac{1}{10}\,b^2\,x^5\,\text{Log}\left[1-c\,x^2\right]\,\text{Log}\left[1+c\,x^2\right]+\frac{1}{20}\,b^2\,x^5\,\text{Log}\left[1+c\,x^2\right]^2+\frac{b^2\,\text{PolyLog}\left[2,1-\frac{2}{1-\sqrt{c}\,x}\right]}{5\,c^{5/2}}+$$
$$\frac{i\,b^2\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,\sqrt{c}\,x}\right]}{5\,c^{5/2}}-\frac{i\,b^2\,\text{PolyLog}\left[2,1-\frac{(1+i)\,\left(1-\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]}{10\,c^{5/2}}+\frac{i\,b^2\,\text{PolyLog}\left[2,1-\frac{2}{1+i\,\sqrt{c}\,x}\right]}{5\,c^{5/2}}+\frac{b^2\,\text{PolyLog}\left[2,1-\frac{2}{1+\sqrt{c}\,x}\right]}{5\,c^{5/2}}-$$
$$\frac{b^2\,\text{PolyLog}\left[2,1+\frac{2\,\sqrt{c}\,\left(1-\sqrt{-c}\,x\right)}{\left(\sqrt{-c}-\sqrt{c}\right)\,\left(1+\sqrt{c}\,x\right)}\right]}{10\,c^{5/2}}-\frac{b^2\,\text{PolyLog}\left[2,1-\frac{2\,\sqrt{c}\,\left(1+\sqrt{-c}\,x\right)}{\left(\sqrt{-c}+\sqrt{c}\right)\,\left(1+\sqrt{c}\,x\right)}\right]}{10\,c^{5/2}}-\frac{i\,b^2\,\text{PolyLog}\left[2,1-\frac{(1-i)\,\left(1+\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]}{10\,c^{5/2}}$$

Result (type 8, 18 leaves):

$$\int x^4 \left(a+b\,\text{ArcTanh}\left[c\,x^2\right]\right)^2 dx$$

Problem 72: Unable to integrate problem.

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

Optimal (type 4, 1129 leaves, 86 steps):

$$\frac{4\,a\,b\,x}{3\,c}-\frac{2}{9}\,a\,b\,x^3-\frac{2\,a\,b\,\text{ArcTan}\left[\sqrt{c}\,x\right]}{3\,c^{3/2}}+\frac{4\,b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]}{3\,c^{3/2}}-\frac{i\,b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]^2}{3\,c^{3/2}}-\frac{4\,b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]}{3\,c^{3/2}}-\frac{b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]^2}{3\,c^{3/2}}+$$

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

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

$$\frac{b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{(1-i)\,\left(1+\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]}{3\,c^{3/2}}-\frac{2\,b^2\,x\,\text{Log}\left[1-c\,x^2\right]}{3\,c}+\frac{1}{9}\,b^2\,x^3\,\text{Log}\left[1-c\,x^2\right]+\frac{b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1-c\,x^2\right]}{3\,c^{3/2}}+\frac{1}{9}\,b\,x^3\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)-$$

$$\frac{b\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)}{3\,c^{3/2}}+\frac{1}{12}\,x^3\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)^2+\frac{2\,b^2\,x\,\text{Log}\left[1+c\,x^2\right]}{3\,c}+\frac{1}{3}\,a\,b\,x^3\,\text{Log}\left[1+c\,x^2\right]-$$

$$\frac{b^2\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1+c\,x^2\right]}{3\,c^{3/2}}-\frac{b^2\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1+c\,x^2\right]}{3\,c^{3/2}}-\frac{1}{6}\,b^2\,x^3\,\text{Log}\left[1-c\,x^2\right]\,\text{Log}\left[1+c\,x^2\right]+\frac{1}{12}\,b^2\,x^3\,\text{Log}\left[1+c\,x^2\right]^2+$$

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

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

Result (type 8, 18 leaves):

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

Problem 75: Unable to integrate problem.

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

Optimal (type 4, 1102 leaves, 64 steps):

$$-\frac{2\,a\,b\,c}{3\,x}-\frac{2}{3}\,a\,b\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]+\frac{4}{3}\,b^2\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]-\frac{1}{3}\,i\,b^2\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]^2+\frac{4}{3}\,b^2\,c^{3/2}\,\text{ArcTanh}\left[\sqrt{c}\,x\right]+$$
$$\frac{1}{3}\,b^2\,c^{3/2}\,\text{ArcTanh}\left[\sqrt{c}\,x\right]^2-\frac{2}{3}\,b^2\,c^{3/2}\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2}{1-\sqrt{c}\,x}\right]+\frac{2}{3}\,b^2\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2}{1-i\,\sqrt{c}\,x}\right]-$$
$$\frac{1}{3}\,b^2\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{(1+i)\left(1-\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]-\frac{2}{3}\,b^2\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2}{1+i\,\sqrt{c}\,x}\right]+\frac{2}{3}\,b^2\,c^{3/2}\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2}{1+\sqrt{c}\,x}\right]-$$
$$\frac{1}{3}\,b^2\,c^{3/2}\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[-\frac{2\,\sqrt{c}\,\left(1-\sqrt{-c}\,x\right)}{\left(\sqrt{-c}-\sqrt{c}\right)\left(1+\sqrt{c}\,x\right)}\right]-\frac{1}{3}\,b^2\,c^{3/2}\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{2\,\sqrt{c}\,\left(1+\sqrt{-c}\,x\right)}{\left(\sqrt{-c}+\sqrt{c}\right)\left(1+\sqrt{c}\,x\right)}\right]-$$
$$\frac{1}{3}\,b^2\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[\frac{(1-i)\left(1+\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]+\frac{b^2\,c\,\text{Log}\left[1-c\,x^2\right]}{3\,x}+\frac{1}{3}\,b^2\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1-c\,x^2\right]-\frac{b\,c\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)}{3\,x}+$$
$$\frac{1}{3}\,b\,c^{3/2}\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)-\frac{\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)^2}{12\,x^3}-\frac{a\,b\,\text{Log}\left[1+c\,x^2\right]}{3\,x^3}-\frac{2\,b^2\,c\,\text{Log}\left[1+c\,x^2\right]}{3\,x}-$$
$$\frac{1}{3}\,b^2\,c^{3/2}\,\text{ArcTan}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1+c\,x^2\right]+\frac{1}{3}\,b^2\,c^{3/2}\,\text{ArcTanh}\left[\sqrt{c}\,x\right]\,\text{Log}\left[1+c\,x^2\right]+\frac{b^2\,\text{Log}\left[1-c\,x^2\right]\,\text{Log}\left[1+c\,x^2\right]}{6\,x^3}-\frac{b^2\,\text{Log}\left[1+c\,x^2\right]^2}{12\,x^3}-$$
$$\frac{1}{3}\,b^2\,c^{3/2}\,\text{PolyLog}\left[2,1-\frac{2}{1-\sqrt{c}\,x}\right]-\frac{1}{3}\,i\,b^2\,c^{3/2}\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,\sqrt{c}\,x}\right]+\frac{1}{6}\,i\,b^2\,c^{3/2}\,\text{PolyLog}\left[2,1-\frac{(1+i)\left(1-\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]-$$
$$\frac{1}{3}\,i\,b^2\,c^{3/2}\,\text{PolyLog}\left[2,1-\frac{2}{1+i\,\sqrt{c}\,x}\right]-\frac{1}{3}\,b^2\,c^{3/2}\,\text{PolyLog}\left[2,1-\frac{2}{1+\sqrt{c}\,x}\right]+\frac{1}{6}\,b^2\,c^{3/2}\,\text{PolyLog}\left[2,1+\frac{2\,\sqrt{c}\,\left(1-\sqrt{-c}\,x\right)}{\left(\sqrt{-c}-\sqrt{c}\right)\left(1+\sqrt{c}\,x\right)}\right]+$$
$$\frac{1}{6}\,b^2\,c^{3/2}\,\text{PolyLog}\left[2,1-\frac{2\,\sqrt{c}\,\left(1+\sqrt{-c}\,x\right)}{\left(\sqrt{-c}+\sqrt{c}\right)\left(1+\sqrt{c}\,x\right)}\right]+\frac{1}{6}\,i\,b^2\,c^{3/2}\,\text{PolyLog}\left[2,1-\frac{(1-i)\left(1+\sqrt{c}\,x\right)}{1-i\,\sqrt{c}\,x}\right]$$

Result (type 8, 18 leaves):

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

Problem 76: Unable to integrate problem.

$$\int \frac{(a+b\,\text{ArcTanh}[c\,x^2])^2}{x^6}\,dx$$

Optimal (type 4, 1176 leaves, 77 steps):

$$-\frac{2abc}{15x^3}+\frac{2abc^2}{5x}-\frac{8b^2c^2}{15x}+\frac{2}{5}abc^{5/2}\text{ArcTan}[\sqrt{c}\,x]-\frac{4}{15}b^2c^{5/2}\text{ArcTan}[\sqrt{c}\,x]+\frac{1}{5}i\,b^2c^{5/2}\text{ArcTan}[\sqrt{c}\,x]^2+$$
$$\frac{4}{15}b^2c^{5/2}\text{ArcTanh}[\sqrt{c}\,x]+\frac{1}{5}b^2c^{5/2}\text{ArcTanh}[\sqrt{c}\,x]^2-\frac{2}{5}b^2c^{5/2}\text{ArcTanh}[\sqrt{c}\,x]\,\text{Log}\left[\frac{2}{1-\sqrt{c}\,x}\right]-$$
$$\frac{2}{5}b^2c^{5/2}\text{ArcTan}[\sqrt{c}\,x]\,\text{Log}\left[\frac{2}{1-i\sqrt{c}\,x}\right]+\frac{1}{5}b^2c^{5/2}\text{ArcTan}[\sqrt{c}\,x]\,\text{Log}\left[\frac{(1+i)(1-\sqrt{c}\,x)}{1-i\sqrt{c}\,x}\right]+\frac{2}{5}b^2c^{5/2}\text{ArcTan}[\sqrt{c}\,x]\,\text{Log}\left[\frac{2}{1+i\sqrt{c}\,x}\right]+$$
$$\frac{2}{5}b^2c^{5/2}\text{ArcTanh}[\sqrt{c}\,x]\,\text{Log}\left[\frac{2}{1+\sqrt{c}\,x}\right]-\frac{1}{5}b^2c^{5/2}\text{ArcTanh}[\sqrt{c}\,x]\,\text{Log}\left[-\frac{2\sqrt{c}\,(1-\sqrt{-c}\,x)}{(\sqrt{-c}-\sqrt{c})(1+\sqrt{c}\,x)}\right]-$$
$$\frac{1}{5}b^2c^{5/2}\text{ArcTanh}[\sqrt{c}\,x]\,\text{Log}\left[\frac{2\sqrt{c}\,(1+\sqrt{-c}\,x)}{(\sqrt{-c}+\sqrt{c})(1+\sqrt{c}\,x)}\right]+\frac{1}{5}b^2c^{5/2}\text{ArcTan}[\sqrt{c}\,x]\,\text{Log}\left[\frac{(1-i)(1+\sqrt{c}\,x)}{1-i\sqrt{c}\,x}\right]+\frac{b^2c\,\text{Log}[1-c\,x^2]}{15x^3}-$$
$$\frac{b^2c^2\,\text{Log}[1-c\,x^2]}{5x}-\frac{1}{5}b^2c^{5/2}\text{ArcTan}[\sqrt{c}\,x]\,\text{Log}[1-c\,x^2]-\frac{bc\,(2a-b\,\text{Log}[1-c\,x^2])}{15x^3}-\frac{bc^2\,(2a-b\,\text{Log}[1-c\,x^2])}{5x}+$$
$$\frac{1}{5}bc^{5/2}\text{ArcTanh}[\sqrt{c}\,x]\,(2a-b\,\text{Log}[1-c\,x^2])-\frac{(2a-b\,\text{Log}[1-c\,x^2])^2}{20x^5}-\frac{ab\,\text{Log}[1+c\,x^2]}{5x^5}-\frac{2b^2c\,\text{Log}[1+c\,x^2]}{15x^3}+$$
$$\frac{1}{5}b^2c^{5/2}\text{ArcTan}[\sqrt{c}\,x]\,\text{Log}[1+c\,x^2]+\frac{1}{5}b^2c^{5/2}\text{ArcTanh}[\sqrt{c}\,x]\,\text{Log}[1+c\,x^2]+\frac{b^2\,\text{Log}[1-c\,x^2]\,\text{Log}[1+c\,x^2]}{10x^5}-\frac{b^2\,\text{Log}[1+c\,x^2]^2}{20x^5}-$$
$$\frac{1}{5}b^2c^{5/2}\text{PolyLog}\left[2,1-\frac{2}{1-\sqrt{c}\,x}\right]+\frac{1}{5}i\,b^2c^{5/2}\text{PolyLog}\left[2,1-\frac{2}{1-i\sqrt{c}\,x}\right]-\frac{1}{10}i\,b^2c^{5/2}\text{PolyLog}\left[2,1-\frac{(1+i)(1-\sqrt{c}\,x)}{1-i\sqrt{c}\,x}\right]+$$
$$\frac{1}{5}i\,b^2c^{5/2}\text{PolyLog}\left[2,1-\frac{2}{1+i\sqrt{c}\,x}\right]-\frac{1}{5}b^2c^{5/2}\text{PolyLog}\left[2,1-\frac{2}{1+\sqrt{c}\,x}\right]+\frac{1}{10}b^2c^{5/2}\text{PolyLog}\left[2,1+\frac{2\sqrt{c}\,(1-\sqrt{-c}\,x)}{(\sqrt{-c}-\sqrt{c})(1+\sqrt{c}\,x)}\right]+$$
$$\frac{1}{10}b^2c^{5/2}\text{PolyLog}\left[2,1-\frac{2\sqrt{c}\,(1+\sqrt{-c}\,x)}{(\sqrt{-c}+\sqrt{c})(1+\sqrt{c}\,x)}\right]-\frac{1}{10}i\,b^2c^{5/2}\text{PolyLog}\left[2,1-\frac{(1-i)(1+\sqrt{c}\,x)}{1-i\sqrt{c}\,x}\right]$$

Result (type 8, 18 leaves):

$$\int \frac{(a + b\,\text{ArcTanh}[c\,x^2])^2}{x^6}\,dx$$

Problem 79: Result unnecessarily involves imaginary or complex numbers.

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

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

$$(a + b\,\text{ArcTanh}[c\,x^2])^3\,\text{ArcTanh}\left[1 - \frac{2}{1 - c\,x^2}\right] - \frac{3}{4}\,b\,(a + b\,\text{ArcTanh}[c\,x^2])^2\,\text{PolyLog}\left[2, 1 - \frac{2}{1 - c\,x^2}\right] + \frac{3}{4}\,b\,(a + b\,\text{ArcTanh}[c\,x^2])^2\,\text{PolyLog}\left[2, -1 + \frac{2}{1 - c\,x^2}\right] + \frac{3}{4}\,b^2\,(a + b\,\text{ArcTanh}[c\,x^2])\,\text{PolyLog}\left[3, 1 - \frac{2}{1 - c\,x^2}\right] - \frac{3}{4}\,b^2\,(a + b\,\text{ArcTanh}[c\,x^2])\,\text{PolyLog}\left[3, -1 + \frac{2}{1 - c\,x^2}\right] - \frac{3}{8}\,b^3\,\text{PolyLog}\left[4, 1 - \frac{2}{1 - c\,x^2}\right] + \frac{3}{8}\,b^3\,\text{PolyLog}\left[4, -1 + \frac{2}{1 - c\,x^2}\right]$$

Result (type 4, 371 leaves):

$$a^3\,\text{Log}[x] + \frac{3}{4}\,a^2\,b\,\left(-\text{PolyLog}[2, -c\,x^2] + \text{PolyLog}[2, c\,x^2]\right) + \frac{3}{2}\,a\,b^2\left(\frac{i\,\pi^3}{24} - \frac{2}{3}\,\text{ArcTanh}[c\,x^2]^3 - \text{ArcTanh}[c\,x^2]^2\,\text{Log}\left[1 + e^{-2\,\text{ArcTanh}[c\,x^2]}\right] + \text{ArcTanh}[c\,x^2]^2\,\text{Log}\left[1 - e^{2\,\text{ArcTanh}[c\,x^2]}\right] + \text{ArcTanh}[c\,x^2]\,\text{PolyLog}\left[2, -e^{-2\,\text{ArcTanh}[c\,x^2]}\right] + \text{ArcTanh}[c\,x^2]\,\text{PolyLog}\left[2, e^{2\,\text{ArcTanh}[c\,x^2]}\right] + \frac{1}{2}\,\text{PolyLog}\left[3, -e^{-2\,\text{ArcTanh}[c\,x^2]}\right] - \frac{1}{2}\,\text{PolyLog}\left[3, e^{2\,\text{ArcTanh}[c\,x^2]}\right]\right) + \frac{1}{128}\,b^3\left(\pi^4 - 32\,\text{ArcTanh}[c\,x^2]^4 - 64\,\text{ArcTanh}[c\,x^2]^3\,\text{Log}\left[1 + e^{-2\,\text{ArcTanh}[c\,x^2]}\right] + 64\,\text{ArcTanh}[c\,x^2]^3\,\text{Log}\left[1 - e^{2\,\text{ArcTanh}[c\,x^2]}\right] + 96\,\text{ArcTanh}[c\,x^2]^2\,\text{PolyLog}\left[2, -e^{-2\,\text{ArcTanh}[c\,x^2]}\right] + 96\,\text{ArcTanh}[c\,x^2]^2\,\text{PolyLog}\left[2, e^{2\,\text{ArcTanh}[c\,x^2]}\right] + 96\,\text{ArcTanh}[c\,x^2]\,\text{PolyLog}\left[3, -e^{-2\,\text{ArcTanh}[c\,x^2]}\right] - 96\,\text{ArcTanh}[c\,x^2]\,\text{PolyLog}\left[3, e^{2\,\text{ArcTanh}[c\,x^2]}\right] + 48\,\text{PolyLog}\left[4, -e^{-2\,\text{ArcTanh}[c\,x^2]}\right] + 48\,\text{PolyLog}\left[4, e^{2\,\text{ArcTanh}[c\,x^2]}\right]\right)$$

Problem 80: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 125 leaves, 6 steps):

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

Result (type 4, 222 leaves):

$$\frac{1}{4}\left(-\frac{2a^3}{x^2}-\frac{6a^2 b\,\mathrm{ArcTanh}[c x^2]}{x^2}+12a^2 b c\,\mathrm{Log}[x]-3a^2 b c\,\mathrm{Log}[1-c^2x^4]+6ab^2c\left(\mathrm{ArcTanh}[c x^2]\left(\left(1-\frac{1}{c x^2}\right)\mathrm{ArcTanh}[c x^2]+2\,\mathrm{Log}\left[1-e^{-2\,\mathrm{ArcTanh}[c x^2]}\right]\right)-\mathrm{PolyLog}\left[2,e^{-2\,\mathrm{ArcTanh}[c x^2]}\right]\right)+2b^3c\left(\frac{i\pi^3}{8}-\mathrm{ArcTanh}[c x^2]^3-\frac{\mathrm{ArcTanh}[c x^2]^3}{c x^2}+3\,\mathrm{ArcTanh}[c x^2]^2\,\mathrm{Log}\left[1-e^{2\,\mathrm{ArcTanh}[c x^2]}\right]+3\,\mathrm{ArcTanh}[c x^2]\,\mathrm{PolyLog}\left[2,e^{2\,\mathrm{ArcTanh}[c x^2]}\right]-\frac{3}{2}\mathrm{PolyLog}\left[3,e^{2\,\mathrm{ArcTanh}[c x^2]}\right]\right)\right)$$

Problem 90: Attempted integration timed out after 120 seconds.

$$\int\sqrt{d x}\,\left(a+b\,\mathrm{ArcTanh}[c x^2]\right)^2\,dx$$

Optimal (type 4, 6327 leaves, 238 steps):

$$-\frac{8}{9}a b x\sqrt{d x}-\frac{2\sqrt{2}\,a b\sqrt{d x}\,\mathrm{ArcTan}\left[1-\sqrt{2}\,c^{1/4}\sqrt{x}\right]}{3c^{3/4}\sqrt{x}}+\frac{2\sqrt{2}\,a b\sqrt{d x}\,\mathrm{ArcTan}\left[1+\sqrt{2}\,c^{1/4}\sqrt{x}\right]}{3c^{3/4}\sqrt{x}}-$$

$$\frac{2i b^2\sqrt{d x}\,\mathrm{ArcTan}\left[(-c)^{1/4}\sqrt{x}\right]^2}{3(-c)^{3/4}\sqrt{x}}-\frac{2i b^2\sqrt{d x}\,\mathrm{ArcTan}\left[c^{1/4}\sqrt{x}\right]^2}{3c^{3/4}\sqrt{x}}-\frac{2b^2\sqrt{d x}\,\mathrm{ArcTanh}\left[(-c)^{1/4}\sqrt{x}\right]^2}{3(-c)^{3/4}\sqrt{x}}-$$

$$\frac{2b^2\sqrt{d x}\,\mathrm{ArcTanh}\left[c^{1/4}\sqrt{x}\right]^2}{3c^{3/4}\sqrt{x}}+\frac{4b^2\sqrt{d x}\,\mathrm{ArcTanh}\left[(-c)^{1/4}\sqrt{x}\right]\mathrm{Log}\left[\frac{2}{1-(-c)^{1/4}\sqrt{x}}\right]}{3(-c)^{3/4}\sqrt{x}}+\frac{4b^2\sqrt{d x}\,\mathrm{ArcTan}\left[(-c)^{1/4}\sqrt{x}\right]\mathrm{Log}\left[\frac{2}{1-i(-c)^{1/4}\sqrt{x}}\right]}{3(-c)^{3/4}\sqrt{x}}-$$

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

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

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

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

$$\frac{2 b^2 \sqrt{d x}\ \text{ArcTanh}\left[(-c)^{1/4} \sqrt{x}\right] \text{Log}\left[\frac{2 (-c)^{1/4} \left(1+\sqrt{-\sqrt{c}}\ \sqrt{x}\right)}{\left(\sqrt{-\sqrt{c}}+(-c)^{1/4}\right) \left(1+(-c)^{1/4} \sqrt{x}\right)}\right]}{3 (-c)^{3/4} \sqrt{x}}+\frac{2 b^2 \sqrt{d x}\ \text{ArcTan}\left[(-c)^{1/4} \sqrt{x}\right] \text{Log}\left[\frac{(1-\mathrm{i}) \left(1+(-c)^{1/4} \sqrt{x}\right)}{1-\mathrm{i}\ (-c)^{1/4} \sqrt{x}}\right]}{3 (-c)^{3/4} \sqrt{x}}+$$

$$\frac{4 b^2 \sqrt{d x}\ \text{ArcTanh}\left[c^{1/4} \sqrt{x}\right] \text{Log}\left[\frac{2}{1-c^{1/4} \sqrt{x}}\right]}{3 c^{3/4} \sqrt{x}}-\frac{2 b^2 \sqrt{d x}\ \text{ArcTan}\left[(-c)^{1/4} \sqrt{x}\right] \text{Log}\left[\frac{2 (-c)^{1/4} \left(1-c^{1/4} \sqrt{x}\right)}{\left((-c)^{1/4}-\mathrm{i}\ c^{1/4}\right) \left(1-\mathrm{i}\ (-c)^{1/4} \sqrt{x}\right)}\right]}{3 (-c)^{3/4} \sqrt{x}}+$$

$$\frac{2 b^2 \sqrt{d x}\ \text{ArcTanh}\left[(-c)^{1/4} \sqrt{x}\right] \text{Log}\left[\frac{2 (-c)^{1/4} \left(1-c^{1/4} \sqrt{x}\right)}{\left((-c)^{1/4}-c^{1/4}\right) \left(1+(-c)^{1/4} \sqrt{x}\right)}\right]}{3 (-c)^{3/4} \sqrt{x}}+\frac{4 b^2 \sqrt{d x}\ \text{ArcTan}\left[c^{1/4} \sqrt{x}\right] \text{Log}\left[\frac{2}{1-\mathrm{i}\ c^{1/4} \sqrt{x}}\right]}{3 c^{3/4} \sqrt{x}}-$$

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

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

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

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

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

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

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

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

$$\frac{\sqrt{2}\,a\,b\sqrt{d\,x}\;\text{Log}\left[1-\sqrt{2}\,c^{1/4}\sqrt{x}+\sqrt{c}\,x\right]}{3\,c^{3/4}\sqrt{x}}-\frac{\sqrt{2}\,a\,b\sqrt{d\,x}\;\text{Log}\left[1+\sqrt{2}\,c^{1/4}\sqrt{x}+\sqrt{c}\,x\right]}{3\,c^{3/4}\sqrt{x}}+\frac{4}{9}\,b^2\,x\sqrt{d\,x}\;\text{Log}\left[1-c\,x^2\right]+$$

$$\frac{2\,b^2\sqrt{d\,x}\;\text{ArcTan}\left[(-c)^{1/4}\sqrt{x}\right]\text{Log}\left[1-c\,x^2\right]}{3\,(-c)^{3/4}\sqrt{x}}-\frac{2\,b^2\sqrt{d\,x}\;\text{ArcTanh}\left[(-c)^{1/4}\sqrt{x}\right]\text{Log}\left[1-c\,x^2\right]}{3\,(-c)^{3/4}\sqrt{x}}+\frac{4}{9}\,b\,x\sqrt{d\,x}\;\left(2\,a-b\,\text{Log}\left[1-c\,x^2\right]\right)+$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\frac{b^2\sqrt{d\,x}\;\text{PolyLog}\Big[2,\,1-\frac{2\,c^{1/4}\left(1+(-c)^{1/4}\sqrt{x}\right)}{\left((-c)^{1/4}+c^{1/4}\right)\left(1+c^{1/4}\sqrt{x}\right)}\Big]}{3\,c^{3/4}\sqrt{x}}+\frac{i\,b^2\sqrt{d\,x}\;\text{PolyLog}\Big[2,\,1-\frac{2\,(-c)^{1/4}\left(1+c^{1/4}\sqrt{x}\right)}{\left((-c)^{1/4}+i\,c^{1/4}\right)\left(1-i\,(-c)^{1/4}\sqrt{x}\right)}\Big]}{3\,(-c)^{3/4}\sqrt{x}}-$$

$$\frac{b^2\sqrt{d\,x}\;\text{PolyLog}\Big[2,\,1-\frac{2\,(-c)^{1/4}\left(1+c^{1/4}\sqrt{x}\right)}{\left((-c)^{1/4}+c^{1/4}\right)\left(1+(-c)^{1/4}\sqrt{x}\right)}\Big]}{3\,(-c)^{3/4}\sqrt{x}}-\frac{i\,b^2\sqrt{d\,x}\;\text{PolyLog}\Big[2,\,1-\frac{(1-i)\left(1+c^{1/4}\sqrt{x}\right)}{1-i\,c^{1/4}\sqrt{x}}\Big]}{3\,c^{3/4}\sqrt{x}}$$

Result (type 1, 1 leaves):

???

Problem 91: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 6177 leaves, 241 steps):

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

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

$$\frac{2\,b^2\sqrt{x}\;\text{ArcTanh}\left[c^{1/4}\sqrt{x}\right]^2}{c^{1/4}\sqrt{d\,x}}+\frac{4\,b^2\sqrt{x}\;\text{ArcTanh}\left[(-c)^{1/4}\sqrt{x}\right]\,\text{Log}\Big[\frac{2}{1-(-c)^{1/4}\sqrt{x}}\Big]}{(-c)^{1/4}\sqrt{d\,x}}-\frac{4\,b^2\sqrt{x}\;\text{ArcTan}\left[(-c)^{1/4}\sqrt{x}\right]\,\text{Log}\Big[\frac{2}{1-i\,(-c)^{1/4}\sqrt{x}}\Big]}{(-c)^{1/4}\sqrt{d\,x}}+$$

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

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

$$\frac{4\,b^2\sqrt{x}\;\text{ArcTanh}\left[(-c)^{1/4}\sqrt{x}\right]\,\text{Log}\Big[\frac{2}{1+(-c)^{1/4}\sqrt{x}}\Big]}{(-c)^{1/4}\sqrt{d\,x}}-\frac{2\,b^2\sqrt{x}\;\text{ArcTanh}\left[(-c)^{1/4}\sqrt{x}\right]\,\text{Log}\Big[-\frac{2\,(-c)^{1/4}\left(1-\sqrt{-\sqrt{-c}}\,\sqrt{x}\right)}{\left(\sqrt{-\sqrt{-c}}-(-c)^{1/4}\right)\left(1+(-c)^{1/4}\sqrt{x}\right)}\Big]}{(-c)^{1/4}\sqrt{d\,x}}-$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 1, 1 leaves):

???

Problem 92: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 6334 leaves, 197 steps):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\frac{2\,b^2\,c^{1/4}\,\sqrt{x}\;\text{ArcTanh}\left[c^{1/4}\,\sqrt{x}\right]\;\text{Log}\left[\frac{2\,c^{1/4}\,\left(1+(-c)^{1/4}\,\sqrt{x}\right)}{\left((-c)^{1/4}+c^{1/4}\right)\,\left(1+c^{1/4}\,\sqrt{x}\right)}\right]}{d\,\sqrt{d\,x}}+\frac{2\,b^2\,(-c)^{1/4}\,\sqrt{x}\;\text{ArcTan}\left[(-c)^{1/4}\,\sqrt{x}\right]\;\text{Log}\left[\frac{2\,(-c)^{1/4}\,\left(1+c^{1/4}\,\sqrt{x}\right)}{\left((-c)^{1/4}+i\,c^{1/4}\right)\,\left(1-i\,(-c)^{1/4}\,\sqrt{x}\right)}\right]}{d\,\sqrt{d\,x}}-$$

$$\frac{2\,b^2\,(-c)^{1/4}\,\sqrt{x}\;\text{ArcTanh}\left[(-c)^{1/4}\,\sqrt{x}\right]\;\text{Log}\left[\frac{2\,(-c)^{1/4}\,\left(1+c^{1/4}\,\sqrt{x}\right)}{\left((-c)^{1/4}+c^{1/4}\right)\,\left(1+(-c)^{1/4}\,\sqrt{x}\right)}\right]}{d\,\sqrt{d\,x}}-\frac{2\,b^2\,c^{1/4}\,\sqrt{x}\;\text{ArcTan}\left[c^{1/4}\,\sqrt{x}\right]\;\text{Log}\left[\frac{(1-i)\,\left(1+c^{1/4}\,\sqrt{x}\right)}{1-i\,c^{1/4}\,\sqrt{x}}\right]}{d\,\sqrt{d\,x}}+$$

$$\frac{\sqrt{2}\;a\,b\,c^{1/4}\,\sqrt{x}\;\text{Log}\left[1-\sqrt{2}\;c^{1/4}\,\sqrt{x}\;+\sqrt{c}\;x\right]}{d\,\sqrt{d\,x}}-\frac{\sqrt{2}\;a\,b\,c^{1/4}\,\sqrt{x}\;\text{Log}\left[1+\sqrt{2}\;c^{1/4}\,\sqrt{x}\;+\sqrt{c}\;x\right]}{d\,\sqrt{d\,x}}-$$

$$\frac{2\,b^2\,(-c)^{1/4}\,\sqrt{x}\;\text{ArcTan}\left[(-c)^{1/4}\,\sqrt{x}\right]\;\text{Log}\left[1-c\,x^2\right]}{d\,\sqrt{d\,x}}+\frac{2\,b^2\,(-c)^{1/4}\,\sqrt{x}\;\text{ArcTanh}\left[(-c)^{1/4}\,\sqrt{x}\right]\;\text{Log}\left[1-c\,x^2\right]}{d\,\sqrt{d\,x}}-$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 1, 1 leaves):

???

Problem 93: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 6520 leaves, 197 steps):

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

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

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

$$\frac{4\,b^2\,(-c)^{3/4}\,\sqrt{x}\,\mathrm{ArcTan}\left[(-c)^{1/4}\,\sqrt{x}\right]\,\mathrm{Log}\left[\frac{2}{1-i\,(-c)^{1/4}\,\sqrt{x}}\right]}{3\,d^2\,\sqrt{d\,x}}-\frac{2\,b^2\,(-c)^{3/4}\,\sqrt{x}\,\mathrm{ArcTan}\left[(-c)^{1/4}\,\sqrt{x}\right]\,\mathrm{Log}\left[-\frac{2\,(-c)^{1/4}\left(1-\sqrt{-\sqrt{c}}\,\sqrt{x}\right)}{\left(i\,\sqrt{-\sqrt{c}}-(-c)^{1/4}\right)\left(1-i\,(-c)^{1/4}\,\sqrt{x}\right)}\right]}{3\,d^2\,\sqrt{d\,x}}-$$

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

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

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

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

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

$$\frac{2\,b^2\,(-c)^{3/4}\,\sqrt{x}\,\mathrm{ArcTanh}\left[(-c)^{1/4}\,\sqrt{x}\right]\,\mathrm{Log}\left[\frac{2\,(-c)^{1/4}\left(1+\sqrt{-\sqrt{c}}\,\sqrt{x}\right)}{\left(\sqrt{-\sqrt{c}}+(-c)^{1/4}\right)\left(1+(-c)^{1/4}\,\sqrt{x}\right)}\right]}{3\,d^2\,\sqrt{d\,x}}+\frac{2\,b^2\,(-c)^{3/4}\,\sqrt{x}\,\mathrm{ArcTan}\left[(-c)^{1/4}\,\sqrt{x}\right]\,\mathrm{Log}\left[\frac{(1-i)\left(1+(-c)^{1/4}\,\sqrt{x}\right)}{1-i\,(-c)^{1/4}\,\sqrt{x}}\right]}{3\,d^2\,\sqrt{d\,x}}-$$

$$\frac{4\,b^2\,c^{3/4}\,\sqrt{x}\,\mathrm{ArcTanh}\left[c^{1/4}\,\sqrt{x}\right]\,\mathrm{Log}\left[\frac{2}{1-c^{1/4}\,\sqrt{x}}\right]}{3\,d^2\,\sqrt{d\,x}}-\frac{2\,b^2\,(-c)^{3/4}\,\sqrt{x}\,\mathrm{ArcTan}\left[(-c)^{1/4}\,\sqrt{x}\right]\,\mathrm{Log}\left[\frac{2\,(-c)^{1/4}\left(1-c^{1/4}\,\sqrt{x}\right)}{\left((-c)^{1/4}-i\,c^{1/4}\right)\left(1-i\,(-c)^{1/4}\,\sqrt{x}\right)}\right]}{3\,d^2\,\sqrt{d\,x}}-$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 1, 1 leaves):

???

Problem 120: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 140 leaves, 7 steps):

$$\frac{2}{3} (a+b \text{ArcTanh}[c x^3])^2 \text{ArcTanh}\left[1-\frac{2}{1-c x^3}\right]-\frac{1}{3} b (a+b \text{ArcTanh}[c x^3]) \text{PolyLog}\left[2, 1-\frac{2}{1-c x^3}\right]+ \frac{1}{3} b (a+b \text{ArcTanh}[c x^3]) \text{PolyLog}\left[2, -1+\frac{2}{1-c x^3}\right]+\frac{1}{6} b^2 \text{PolyLog}\left[3, 1-\frac{2}{1-c x^3}\right]-\frac{1}{6} b^2 \text{PolyLog}\left[3, -1+\frac{2}{1-c x^3}\right]$$

Result (type 4, 181 leaves):

$$a^2 \text{Log}[x]+\frac{1}{3} a b \left(-\text{PolyLog}[2, -c x^3]+\text{PolyLog}[2, c x^3]\right)+ \frac{1}{3} b^2 \left(\frac{i \pi^3}{24}-\frac{2}{3} \text{ArcTanh}[c x^3]^3-\text{ArcTanh}[c x^3]^2 \text{Log}\left[1+e^{-2 \text{ArcTanh}[c x^3]}\right]+\text{ArcTanh}[c x^3]^2 \text{Log}\left[1-e^{2 \text{ArcTanh}[c x^3]}\right]+\text{ArcTanh}[c x^3] \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c x^3]}\right]+\text{ArcTanh}[c x^3] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x^3]}\right]+\frac{1}{2} \text{PolyLog}\left[3, -e^{-2 \text{ArcTanh}[c x^3]}\right]-\frac{1}{2} \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x^3]}\right]\right)$$

Problem 127: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 210 leaves, 9 steps):

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

Result (type 4, 368 leaves):

$$a^3 \text{Log}[x] + \frac{1}{2} a^2 b \left(-\text{PolyLog}[2, -c x^3] + \text{PolyLog}[2, c x^3]\right) + a b^2 \left(\frac{i \pi^3}{24} - \frac{2}{3} \text{ArcTanh}[c x^3]^3 - \text{ArcTanh}[c x^3]^2 \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x^3]}\right] + \text{ArcTanh}[c x^3]^2 \text{Log}\left[1 - e^{2 \text{ArcTanh}[c x^3]}\right] + \text{ArcTanh}[c x^3] \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c x^3]}\right] + \text{ArcTanh}[c x^3] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x^3]}\right] + \frac{1}{2} \text{PolyLog}\left[3, -e^{-2 \text{ArcTanh}[c x^3]}\right] - \frac{1}{2} \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x^3]}\right]\right) + \frac{1}{192} b^3 \left(\pi^4 - 32 \text{ArcTanh}[c x^3]^4 - 64 \text{ArcTanh}[c x^3]^3 \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x^3]}\right] + 64 \text{ArcTanh}[c x^3]^3 \text{Log}\left[1 - e^{2 \text{ArcTanh}[c x^3]}\right] + 96 \text{ArcTanh}[c x^3]^2 \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c x^3]}\right] + 96 \text{ArcTanh}[c x^3]^2 \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x^3]}\right] + 96 \text{ArcTanh}[c x^3] \text{PolyLog}\left[3, -e^{-2 \text{ArcTanh}[c x^3]}\right] - 96 \text{ArcTanh}[c x^3] \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x^3]}\right] + 48 \text{PolyLog}\left[4, -e^{-2 \text{ArcTanh}[c x^3]}\right] + 48 \text{PolyLog}\left[4, e^{2 \text{ArcTanh}[c x^3]}\right]\right)$$

Problem 128: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(a + b \text{ArcTanh}[c x^3])^3}{x^4} \, dx$$

Optimal (type 4, 120 leaves, 6 steps):

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

Result (type 4, 223 leaves):

$$-\frac{a^3}{3 x^3} - \frac{a^2 b \text{ArcTanh}[c x^3]}{x^3} + 3 a^2 b c \text{Log}[x] - \frac{1}{2} a^2 b c \text{Log}[1 - c^2 x^6] + a b^2 c \left(\text{ArcTanh}[c x^3] \left(\left(1 - \frac{1}{c x^3}\right) \text{ArcTanh}[c x^3] + 2 \text{Log}\left[1 - e^{-2 \text{ArcTanh}[c x^3]}\right]\right) - \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x^3]}\right]\right) + \frac{1}{3} b^3 c \left(\frac{i \pi^3}{8} - \text{ArcTanh}[c x^3]^3 - \frac{\text{ArcTanh}[c x^3]^3}{c x^3} + 3 \text{ArcTanh}[c x^3]^2 \text{Log}\left[1 - e^{2 \text{ArcTanh}[c x^3]}\right] + 3 \text{ArcTanh}[c x^3] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x^3]}\right] - \frac{3}{2} \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x^3]}\right]\right)$$

Problem 147: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 133 leaves, 7 steps):

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

Result (type 4, 177 leaves):

$$a^2\,\text{Log}[x]+a\,b\left(\text{PolyLog}\left[2,-\frac{c}{x}\right]-\text{PolyLog}\left[2,\frac{c}{x}\right]\right)+b^2\left(-\frac{i\,\pi^3}{24}+\frac{2}{3}\text{ArcTanh}\left[\frac{c}{x}\right]^3+\text{ArcTanh}\left[\frac{c}{x}\right]^2\text{Log}\left[1+e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-\text{ArcTanh}\left[\frac{c}{x}\right]^2\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-\text{ArcTanh}\left[\frac{c}{x}\right]\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-\text{ArcTanh}\left[\frac{c}{x}\right]\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]+\frac{1}{2}\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]\right)$$

Problem 151: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 217 leaves, 15 steps):

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

Result (type 4, 316 leaves):

$$\frac{1}{6}\left(3\,a^2\,b\,c\,x^2+2\,a^3\,x^3+6\,a^2\,b\,x^3\,\text{ArcTanh}\left[\frac{c}{x}\right]+3\,a^2\,b\,c^3\,\text{Log}\left[-c^2+x^2\right]+\right.$$
$$6\,a\,b^2\left(c^2\,x+\left(-c^3+x^3\right)\text{ArcTanh}\left[\frac{c}{x}\right]^2+c\,\text{ArcTanh}\left[\frac{c}{x}\right]\left(-c^2+x^2-2\,c^2\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]\right)+c^3\,\text{PolyLog}\left[2,\,e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]\right)+$$
$$\frac{1}{4}\,b^3\left(-i\,c^3\,\pi^3+24\,c^2\,x\,\text{ArcTanh}\left[\frac{c}{x}\right]-12\,c^3\,\text{ArcTanh}\left[\frac{c}{x}\right]^2+12\,c\,x^2\,\text{ArcTanh}\left[\frac{c}{x}\right]^2+8\,c^3\,\text{ArcTanh}\left[\frac{c}{x}\right]^3+8\,x^3\,\text{ArcTanh}\left[\frac{c}{x}\right]^3-\right.$$
$$\left.\left.24\,c^3\,\text{ArcTanh}\left[\frac{c}{x}\right]^2\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-24\,c^3\,\text{Log}\left[\frac{c}{\sqrt{1-\frac{c^2}{x^2}}\,x}\right]-24\,c^3\,\text{ArcTanh}\left[\frac{c}{x}\right]\text{PolyLog}\left[2,\,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]+12\,c^3\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]\right)\right)$$

Problem 153: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{ArcTanh}\left[\frac{c}{x}\right]\right)^3\,dx$$

Optimal (type 4, 108 leaves, 6 steps):

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

Result (type 4, 198 leaves):

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

Problem 154: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{c}{x}\right]\right)^3}{x}\,dx$$

Optimal (type 4, 208 leaves, 9 steps):

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

Result (type 4, 373 leaves):

$$a^3\,\text{Log}[x]+\frac{3}{2}a^2 b\left(\text{PolyLog}\left[2,-\frac{c}{x}\right]-\text{PolyLog}\left[2,\frac{c}{x}\right]\right)+3\,a\,b^2\left(-\frac{i\pi^3}{24}+\frac{2}{3}\text{ArcTanh}\left[\frac{c}{x}\right]^3+\text{ArcTanh}\left[\frac{c}{x}\right]^2\text{Log}\left[1+e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-\text{ArcTanh}\left[\frac{c}{x}\right]^2\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-\text{ArcTanh}\left[\frac{c}{x}\right]\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-\text{ArcTanh}\left[\frac{c}{x}\right]\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]+\frac{1}{2}\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]\right)+\frac{1}{64}b^3\left(-\pi^4+32\,\text{ArcTanh}\left[\frac{c}{x}\right]^4+64\,\text{ArcTanh}\left[\frac{c}{x}\right]^3\text{Log}\left[1+e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-64\,\text{ArcTanh}\left[\frac{c}{x}\right]^3\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-96\,\text{ArcTanh}\left[\frac{c}{x}\right]^2\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-96\,\text{ArcTanh}\left[\frac{c}{x}\right]^2\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-96\,\text{ArcTanh}\left[\frac{c}{x}\right]\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]+96\,\text{ArcTanh}\left[\frac{c}{x}\right]\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-48\,\text{PolyLog}\left[4,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]-48\,\text{PolyLog}\left[4,e^{2\,\text{ArcTanh}\left[\frac{c}{x}\right]}\right]\right)$$

Problem 173: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 144 leaves, 7 steps):

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

Result (type 4, 183 leaves) :

$$a^2\,\text{Log}[x]+\frac{1}{2}a\,b\left(\text{PolyLog}\left[2,-\frac{c}{x^2}\right]-\text{PolyLog}\left[2,\frac{c}{x^2}\right]\right)+$$
$$\frac{1}{2}b^2\left(-\frac{i\,\pi^3}{24}+\frac{2}{3}\text{ArcTanh}\left[\frac{c}{x^2}\right]^3+\text{ArcTanh}\left[\frac{c}{x^2}\right]^2\text{Log}\left[1+e^{-2\,\text{ArcTanh}\left[\frac{c}{x^2}\right]}\right]-\text{ArcTanh}\left[\frac{c}{x^2}\right]^2\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[\frac{c}{x^2}\right]}\right]-\right.$$
$$\left.\text{ArcTanh}\left[\frac{c}{x^2}\right]\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x^2}\right]}\right]-\text{ArcTanh}\left[\frac{c}{x^2}\right]\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}\left[\frac{c}{x^2}\right]}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}\left[\frac{c}{x^2}\right]}\right]+\frac{1}{2}\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}\left[\frac{c}{x^2}\right]}\right]\right)$$

Problem 176: Unable to integrate problem.

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

Optimal (type 4, 1214 leaves, 98 steps) :

$$\frac{8}{15} b^2 c^2 x + \frac{2}{15} a b c x^3 + \frac{2}{5} a b c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] - \frac{4}{15} b^2 c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] - \frac{1}{5} i b^2 c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]^2 -$$

$$\frac{4}{15} b^2 c^{5/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right] + \frac{1}{5} b^2 c^{5/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]^2 + \frac{2}{5} b^2 c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[2 - \frac{2\sqrt{c}}{\sqrt{c} - i x}\right] - \frac{1}{15} b^2 c x^3 \text{Log}\left[1 - \frac{c}{x^2}\right] -$$

$$\frac{1}{5} b^2 c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[1 - \frac{c}{x^2}\right] + \frac{1}{15} b c x^3 \left(2 a - b \text{Log}\left[1 - \frac{c}{x^2}\right]\right) - \frac{1}{5} b c^{5/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right] \left(2 a - b \text{Log}\left[1 - \frac{c}{x^2}\right]\right) +$$

$$\frac{1}{20} x^5 \left(2 a - b \text{Log}\left[1 - \frac{c}{x^2}\right]\right)^2 + \frac{2}{15} b^2 c x^3 \text{Log}\left[1 + \frac{c}{x^2}\right] + \frac{1}{5} a b x^5 \text{Log}\left[1 + \frac{c}{x^2}\right] + \frac{1}{5} b^2 c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[1 + \frac{c}{x^2}\right] -$$

$$\frac{1}{5} b^2 c^{5/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[1 + \frac{c}{x^2}\right] - \frac{1}{10} b^2 x^5 \text{Log}\left[1 - \frac{c}{x^2}\right] \text{Log}\left[1 + \frac{c}{x^2}\right] + \frac{1}{20} b^2 x^5 \text{Log}\left[1 + \frac{c}{x^2}\right]^2 -$$

$$\frac{2}{5} b^2 c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[\frac{2\sqrt{c}}{\sqrt{c} - i x}\right] + \frac{1}{5} b^2 c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[\frac{(1+i)\left(\sqrt{c} - x\right)}{\sqrt{c} - i x}\right] - \frac{2}{5} b^2 c^{5/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[\frac{2\sqrt{c}}{\sqrt{c} + x}\right] +$$

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

$$\frac{1}{5} b^2 c^{5/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[\frac{(1-i)\left(\sqrt{c} + x\right)}{\sqrt{c} - i x}\right] + \frac{2}{5} b^2 c^{5/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[2 - \frac{2\sqrt{c}}{\sqrt{c} + x}\right] +$$

$$\frac{1}{5} i b^2 c^{5/2} \text{PolyLog}\left[2, 1 - \frac{2\sqrt{c}}{\sqrt{c} - i x}\right] - \frac{1}{5} i b^2 c^{5/2} \text{PolyLog}\left[2, -1 + \frac{2\sqrt{c}}{\sqrt{c} - i x}\right] - \frac{1}{10} i b^2 c^{5/2} \text{PolyLog}\left[2, 1 - \frac{(1+i)\left(\sqrt{c} - x\right)}{\sqrt{c} - i x}\right] +$$

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

$$\frac{1}{5} b^2 c^{5/2} \text{PolyLog}\left[2, 1 - \frac{2\sqrt{c}}{\sqrt{c} + x}\right] - \frac{1}{5} b^2 c^{5/2} \text{PolyLog}\left[2, -1 + \frac{2\sqrt{c}}{\sqrt{c} + x}\right] - \frac{1}{10} b^2 c^{5/2} \text{PolyLog}\left[2, 1 - \frac{2\sqrt{c}\left(\sqrt{-c} - x\right)}{\left(\sqrt{-c} - \sqrt{c}\right)\left(\sqrt{c} + x\right)}\right] -$$

$$\frac{1}{10} b^2 c^{5/2} \text{PolyLog}\left[2, 1 - \frac{2\sqrt{c}\left(\sqrt{-c} + x\right)}{\left(\sqrt{-c} + \sqrt{c}\right)\left(\sqrt{c} + x\right)}\right] - \frac{1}{10} i b^2 c^{5/2} \text{PolyLog}\left[2, 1 - \frac{(1-i)\left(\sqrt{c} + x\right)}{\sqrt{c} - i x}\right]$$

Result (type 8, 18 leaves):

$$\int x^4 \left(a + b \text{ArcTanh}\left[\frac{c}{x^2}\right]\right)^2 dx$$

Problem 177: Unable to integrate problem.

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

Optimal (type 4, 1172 leaves, 80 steps):

$$\frac{4}{3} a b c x-\frac{2}{3} a b c^{3/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]+\frac{4}{3} b^2 c^{3/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]+\frac{1}{3} \mathrm{i}\, b^2 c^{3/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]^2-\frac{4}{3} b^2 c^{3/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]+$$

$$\frac{1}{3} b^2 c^{3/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]^2-\frac{2}{3} b^2 c^{3/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[2-\frac{2 \sqrt{c}}{\sqrt{c}-\mathrm{i}\, x}\right]-\frac{2}{3} b^2 c x \,\text{Log}\left[1-\frac{c}{x^2}\right]+\frac{1}{3} b^2 c^{3/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[1-\frac{c}{x^2}\right]-$$

$$\frac{1}{3} b c^{3/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right] \left(2 a-b \,\text{Log}\left[1-\frac{c}{x^2}\right]\right)+\frac{1}{12} x^3 \left(2 a-b\, \text{Log}\left[1-\frac{c}{x^2}\right]\right)^2+\frac{2}{3} b^2 c x\, \text{Log}\left[1+\frac{c}{x^2}\right]+\frac{1}{3} a b x^3 \,\text{Log}\left[1+\frac{c}{x^2}\right]-$$

$$\frac{1}{3} b^2 c^{3/2} \text{ArcTan}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[1+\frac{c}{x^2}\right]-\frac{1}{3} b^2 c^{3/2} \text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right] \text{Log}\left[1+\frac{c}{x^2}\right]-\frac{1}{6} b^2 x^3 \,\text{Log}\left[1-\frac{c}{x^2}\right] \text{Log}\left[1+\frac{c}{x^2}\right]+\frac{1}{12} b^2 x^3 \,\text{Log}\left[1+\frac{c}{x^2}\right]^2+$$

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

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

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

$$\frac{1}{3} \mathrm{i}\, b^2 c^{3/2} \text{PolyLog}\left[2,1-\frac{2 \sqrt{c}}{\sqrt{c}-\mathrm{i}\, x}\right]+\frac{1}{3} \mathrm{i}\, b^2 c^{3/2} \text{PolyLog}\left[2,-1+\frac{2 \sqrt{c}}{\sqrt{c}-\mathrm{i}\, x}\right]+\frac{1}{6} \mathrm{i}\, b^2 c^{3/2} \text{PolyLog}\left[2,1-\frac{(1+\mathrm{i}) \left(\sqrt{c}-x\right)}{\sqrt{c}-\mathrm{i}\, x}\right]+$$

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

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

$$\frac{1}{6} b^2 c^{3/2} \text{PolyLog}\left[2,1-\frac{2 \sqrt{c} \left(\sqrt{-c}+x\right)}{\left(\sqrt{-c}+\sqrt{c}\right) \left(\sqrt{c}+x\right)}\right]+\frac{1}{6} \mathrm{i}\, b^2 c^{3/2} \text{PolyLog}\left[2,1-\frac{(1-\mathrm{i}) \left(\sqrt{c}+x\right)}{\sqrt{c}-\mathrm{i}\, x}\right]$$

Result (type 8, 18 leaves):

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

Problem 180: Unable to integrate problem.

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

Optimal (type 4, 1263 leaves, 105 steps):

$$\frac{2\,a\,b}{9\,x^3}-\frac{2\,a\,b}{3\,c\,x}-\frac{2\,a\,b\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]}{3\,c^{3/2}}+\frac{4\,b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]}{3\,c^{3/2}}+\frac{i\,b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]^2}{3\,c^{3/2}}+\frac{4\,b^2\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]}{3\,c^{3/2}}-\frac{b^2\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]^2}{3\,c^{3/2}}-$$

$$\frac{2\,b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\,\text{Log}\left[2-\frac{2\sqrt{c}}{\sqrt{c}-i\,x}\right]}{3\,c^{3/2}}-\frac{b^2\,\text{Log}\left[1-\frac{c}{x^2}\right]}{9\,x^3}+\frac{b^2\,\text{Log}\left[1-\frac{c}{x^2}\right]}{3\,c\,x}+\frac{b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\,\text{Log}\left[1-\frac{c}{x^2}\right]}{3\,c^{3/2}}-\frac{b\,\left(2\,a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)}{9\,x^3}-$$

$$\frac{b\,\left(2\,a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)}{3\,c\,x}+\frac{b\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]\,\left(2\,a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)}{3\,c^{3/2}}-\frac{\left(2\,a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)^2}{12\,x^3}-\frac{a\,b\,\text{Log}\left[1+\frac{c}{x^2}\right]}{3\,x^3}-\frac{2\,b^2\,\text{Log}\left[1+\frac{c}{x^2}\right]}{3\,c\,x}-$$

$$\frac{b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\,\text{Log}\left[1+\frac{c}{x^2}\right]}{3\,c^{3/2}}+\frac{b^2\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]\,\text{Log}\left[1+\frac{c}{x^2}\right]}{3\,c^{3/2}}+\frac{b^2\,\text{Log}\left[1-\frac{c}{x^2}\right]\,\text{Log}\left[1+\frac{c}{x^2}\right]}{6\,x^3}-\frac{b^2\,\text{Log}\left[1+\frac{c}{x^2}\right]^2}{12\,x^3}+\frac{2\,b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\,\text{Log}\left[\frac{2\sqrt{c}}{\sqrt{c}-i\,x}\right]}{3\,c^{3/2}}-$$

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

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

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

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

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

Result (type 8, 18 leaves):

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

Problem 181: Unable to integrate problem.

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{c}{x^2}\right]\right)^2}{x^6}\,dx$$

Optimal (type 4, 1337 leaves, 130 steps):

$$\frac{2ab}{25x^5}-\frac{2ab}{15cx^3}+\frac{2ab}{5c^2x}-\frac{8b^2}{15c^2x}+\frac{2ab\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]}{5c^{5/2}}-\frac{4b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]}{15c^{5/2}}-\frac{i\,b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]^2}{5c^{5/2}}+\frac{4b^2\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]}{15c^{5/2}}-$$

$$\frac{b^2\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]^2}{5c^{5/2}}+\frac{2b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\text{Log}\left[2-\frac{2\sqrt{c}}{\sqrt{c}-i x}\right]}{5c^{5/2}}-\frac{b^2\,\text{Log}\left[1-\frac{c}{x^2}\right]}{25x^5}+\frac{b^2\,\text{Log}\left[1-\frac{c}{x^2}\right]}{15cx^3}-\frac{b^2\,\text{Log}\left[1-\frac{c}{x^2}\right]}{5c^2x}-\frac{b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\text{Log}\left[1-\frac{c}{x^2}\right]}{5c^{5/2}}-$$

$$\frac{b\left(2a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)}{25x^5}-\frac{b\left(2a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)}{15cx^3}-\frac{b\left(2a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)}{5c^2x}+\frac{b\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]\left(2a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)}{5c^{5/2}}-\frac{\left(2a-b\,\text{Log}\left[1-\frac{c}{x^2}\right]\right)^2}{20x^5}-$$

$$\frac{ab\,\text{Log}\left[1+\frac{c}{x^2}\right]}{5x^5}-\frac{2b^2\,\text{Log}\left[1+\frac{c}{x^2}\right]}{15cx^3}+\frac{b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\text{Log}\left[1+\frac{c}{x^2}\right]}{5c^{5/2}}+\frac{b^2\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]\text{Log}\left[1+\frac{c}{x^2}\right]}{5c^{5/2}}+\frac{b^2\,\text{Log}\left[1-\frac{c}{x^2}\right]\text{Log}\left[1+\frac{c}{x^2}\right]}{10x^5}-$$

$$\frac{b^2\,\text{Log}\left[1+\frac{c}{x^2}\right]^2}{20x^5}-\frac{2b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\text{Log}\left[\frac{2\sqrt{c}}{\sqrt{c}-i x}\right]}{5c^{5/2}}+\frac{b^2\,\text{ArcTan}\left[\frac{x}{\sqrt{c}}\right]\text{Log}\left[\frac{(1+i)\left(\sqrt{c}-x\right)}{\sqrt{c}-i x}\right]}{5c^{5/2}}+\frac{2b^2\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]\text{Log}\left[\frac{2\sqrt{c}}{\sqrt{c}+x}\right]}{5c^{5/2}}-$$

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

$$\frac{2b^2\,\text{ArcTanh}\left[\frac{x}{\sqrt{c}}\right]\text{Log}\left[2-\frac{2\sqrt{c}}{\sqrt{c}+x}\right]}{5c^{5/2}}+\frac{i\,b^2\,\text{PolyLog}\left[2,1-\frac{2\sqrt{c}}{\sqrt{c}-i x}\right]}{5c^{5/2}}-\frac{i\,b^2\,\text{PolyLog}\left[2,-1+\frac{2\sqrt{c}}{\sqrt{c}-i x}\right]}{5c^{5/2}}-\frac{i\,b^2\,\text{PolyLog}\left[2,1-\frac{(1+i)\left(\sqrt{c}-x\right)}{\sqrt{c}-i x}\right]}{10c^{5/2}}-$$

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

$$\frac{b^2\,\text{PolyLog}\left[2,-1+\frac{2\sqrt{c}}{\sqrt{c}+x}\right]}{5c^{5/2}}+\frac{b^2\,\text{PolyLog}\left[2,1-\frac{2\sqrt{c}\left(\sqrt{-c}-x\right)}{\left(\sqrt{-c}-\sqrt{c}\right)\left(\sqrt{c}+x\right)}\right]}{10c^{5/2}}+\frac{b^2\,\text{PolyLog}\left[2,1-\frac{2\sqrt{c}\left(\sqrt{-c}+x\right)}{\left(\sqrt{-c}+\sqrt{c}\right)\left(\sqrt{c}+x\right)}\right]}{10c^{5/2}}-\frac{i\,b^2\,\text{PolyLog}\left[2,1-\frac{(1-i)\left(\sqrt{c}+x\right)}{\sqrt{c}-i x}\right]}{10c^{5/2}}$$

Result (type 8, 18 leaves):

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{c}{x^2}\right]\right)^2}{x^6}\,dx$$

Problem 199: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 145 leaves, 7 steps):

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

Result (type 4, 203 leaves):

$$a^2\,\text{Log}[x]+2\,a\,b\left(-\text{PolyLog}\left[2,-c\sqrt{x}\right]+\text{PolyLog}\left[2,c\sqrt{x}\right]\right)+2\,b^2\left(\frac{i\,\pi^3}{24}-\frac{2}{3}\text{ArcTanh}\left[c\sqrt{x}\right]^3-\text{ArcTanh}\left[c\sqrt{x}\right]^2\text{Log}\left[1+e^{-2\,\text{ArcTanh}\left[c\sqrt{x}\right]}\right]+\text{ArcTanh}\left[c\sqrt{x}\right]^2\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[c\sqrt{x}\right]}\right]+\text{ArcTanh}\left[c\sqrt{x}\right]\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}\left[c\sqrt{x}\right]}\right]+\text{ArcTanh}\left[c\sqrt{x}\right]\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}\left[c\sqrt{x}\right]}\right]+\frac{1}{2}\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}\left[c\sqrt{x}\right]}\right]-\frac{1}{2}\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}\left[c\sqrt{x}\right]}\right]\right)$$

Problem 206: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 224 leaves, 9 steps):

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

Result (type 4, 423 leaves):

$$a^3 \text{Log}[x] + 3 a^2 b \left(-\text{PolyLog}[2, -c\sqrt{x}] + \text{PolyLog}[2, c\sqrt{x}]\right) +$$
$$6 a b^2 \left(\frac{i \pi^3}{24} - \frac{2}{3} \text{ArcTanh}[c\sqrt{x}]^3 - \text{ArcTanh}[c\sqrt{x}]^2 \text{Log}[1 + e^{-2 \text{ArcTanh}[c\sqrt{x}]}] + \text{ArcTanh}[c\sqrt{x}]^2 \text{Log}[1 - e^{2 \text{ArcTanh}[c\sqrt{x}]}] + \right.$$
$$\text{ArcTanh}[c\sqrt{x}] \text{PolyLog}[2, -e^{-2 \text{ArcTanh}[c\sqrt{x}]}] + \text{ArcTanh}[c\sqrt{x}] \text{PolyLog}[2, e^{2 \text{ArcTanh}[c\sqrt{x}]}] +$$
$$\left.\frac{1}{2} \text{PolyLog}[3, -e^{-2 \text{ArcTanh}[c\sqrt{x}]}] - \frac{1}{2} \text{PolyLog}[3, e^{2 \text{ArcTanh}[c\sqrt{x}]}]\right) +$$
$$\frac{1}{32} b^3 \left(\pi^4 - 32 \text{ArcTanh}[c\sqrt{x}]^4 - 64 \text{ArcTanh}[c\sqrt{x}]^3 \text{Log}[1 + e^{-2 \text{ArcTanh}[c\sqrt{x}]}] + 64 \text{ArcTanh}[c\sqrt{x}]^3 \text{Log}[1 - e^{2 \text{ArcTanh}[c\sqrt{x}]}] + 96 \text{ArcTanh}[c\sqrt{x}]^2 \right.$$
$$\text{PolyLog}[2, -e^{-2 \text{ArcTanh}[c\sqrt{x}]}] + 96 \text{ArcTanh}[c\sqrt{x}]^2 \text{PolyLog}[2, e^{2 \text{ArcTanh}[c\sqrt{x}]}] + 96 \text{ArcTanh}[c\sqrt{x}] \text{PolyLog}[3, -e^{-2 \text{ArcTanh}[c\sqrt{x}]}] -$$
$$\left.96 \text{ArcTanh}[c\sqrt{x}] \text{PolyLog}[3, e^{2 \text{ArcTanh}[c\sqrt{x}]}] + 48 \text{PolyLog}[4, -e^{-2 \text{ArcTanh}[c\sqrt{x}]}] + 48 \text{PolyLog}[4, e^{2 \text{ArcTanh}[c\sqrt{x}]}]\right)$$

Problem 222: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 156 leaves, 7 steps):

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

Result (type 4, 207 leaves):

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

Problem 227: Result unnecessarily involves higher level functions.

$$\int \frac{a + b \text{ArcTanh}[c x^n]}{x} \, dx$$

Optimal (type 4, 36 leaves, 2 steps):

$$a \text{Log}[x] - \frac{b \text{PolyLog}[2, -c x^n]}{2 n} + \frac{b \text{PolyLog}[2, c x^n]}{2 n}$$

Result (type 5, 39 leaves):

$$\frac{b\, c\, x^n\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{2}, \frac{1}{2}, 1\right\}, \left\{\frac{3}{2}, \frac{3}{2}\right\}, c^2 x^{2n}\right]}{n} + a\, \text{Log}[x]$$

Problem 233: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 148 leaves, 7 steps):

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

Result (type 4, 181 leaves):

$$a^2\, \text{Log}[x] + \frac{a\, b\, (-\text{PolyLog}[2, -c\, x^n] + \text{PolyLog}[2, c\, x^n])}{n} + \frac{1}{n} b^2 \left(\frac{i\, \pi^3}{24} - \frac{2}{3} \text{ArcTanh}[c\, x^n]^3 - \text{ArcTanh}[c\, x^n]^2\, \text{Log}\left[1 + e^{-2\, \text{ArcTanh}[c\, x^n]}\right] + \text{ArcTanh}[c\, x^n]^2\, \text{Log}\left[1 - e^{2\, \text{ArcTanh}[c\, x^n]}\right] + \text{ArcTanh}[c\, x^n]\, \text{PolyLog}\left[2, -e^{-2\, \text{ArcTanh}[c\, x^n]}\right] + \text{ArcTanh}[c\, x^n]\, \text{PolyLog}\left[2, e^{2\, \text{ArcTanh}[c\, x^n]}\right] + \frac{1}{2} \text{PolyLog}\left[3, -e^{-2\, \text{ArcTanh}[c\, x^n]}\right] - \frac{1}{2} \text{PolyLog}\left[3, e^{2\, \text{ArcTanh}[c\, x^n]}\right]\right)$$

Problem 236: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 30 leaves, 2 steps):

$$-\frac{\text{PolyLog}[2, -a\, x^n]}{2\, n} + \frac{\text{PolyLog}[2, a\, x^n]}{2\, n}$$

Result (type 5, 33 leaves):

$$\frac{a\, x^n\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{2}, \frac{1}{2}, 1\right\}, \left\{\frac{3}{2}, \frac{3}{2}\right\}, a^2 x^{2n}\right]}{n}$$

Test results for the 49 problems in "7.3.3 (d+e x)^m (a+b arctanh(c x^n))^p.m"

Problem 5: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 4, 257 leaves):

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

Problem 12: Unable to integrate problem.

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

Optimal (type 4, 188 leaves, 1 step):

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

Result (type 8, 20 leaves):

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

Problem 13: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 321 leaves, 12 steps):

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

Result (type 4, 317 leaves):

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

$$\frac{1}{d}b^2\left(-\frac{e^{-\text{ArcTanh}\left[\frac{c\,d}{e}\right]}\,\text{ArcTanh}[c\,x]^2}{\sqrt{1-\frac{c^2\,d^2}{e^2}}\;e}+\frac{x\,\text{ArcTanh}[c\,x]^2}{d+e\,x}+\frac{1}{c^2\,d^2-e^2}c\,d\left(i\,\pi\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[c\,x]}\right]-\right.\right.$$

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

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

Problem 14: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 480 leaves, 18 steps):

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

Result (type 4, 467 leaves):

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

Problem 18: Unable to integrate problem.

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

Optimal (type 4, 272 leaves, 1 step):

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

Result (type 8, 20 leaves):

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

Problem 19: Unable to integrate problem.

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

Optimal (type 4, 517 leaves, 9 steps):

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

Result (type 8, 20 leaves):

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

Problem 20: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 953 leaves, 21 steps):

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

Result (type 1, 1 leaves):

???

Problem 21: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{a+b\,\text{ArcTanh}[c\,x]}{1+2\,c\,x}\,dx$$

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

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

Result (type 4, 240 leaves):

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

Problem 22: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{ArcTanh}[x]}{1-\sqrt{2}\,x}\,dx$$

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

$$-\frac{\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]\text{Log}\left[1-\sqrt{2}\,x\right]}{\sqrt{2}}-\frac{\text{PolyLog}\left[2,-\frac{\sqrt{2}-2x}{2-\sqrt{2}}\right]}{2\sqrt{2}}+\frac{\text{PolyLog}\left[2,\frac{\sqrt{2}-2x}{2+\sqrt{2}}\right]}{2\sqrt{2}}$$

Result (type 4, 272 leaves):

$$\frac{1}{8\sqrt{2}}\left(\pi^2-4\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]^2-4\,i\,\pi\,\text{ArcTanh}[x]+8\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]\text{ArcTanh}[x]-8\,\text{ArcTanh}[x]^2+\right.$$
$$8\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]-2\,\text{ArcTanh}[x]}\right]-8\,\text{ArcTanh}[x]\,\text{Log}\left[1-e^{2\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]-2\,\text{ArcTanh}[x]}\right]+4\,i\,\pi\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[x]}\right]+$$
$$8\,\text{ArcTanh}[x]\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[x]}\right]-4\,i\,\pi\,\text{Log}\left[\frac{2}{\sqrt{1-x^2}}\right]-8\,\text{ArcTanh}[x]\,\text{Log}\left[\frac{2}{\sqrt{1-x^2}}\right]-4\,\text{ArcTanh}[x]\,\text{Log}\left[1-x^2\right]-$$
$$8\,\text{ArcTanh}[x]\,\text{Log}\left[-i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]-\text{ArcTanh}[x]\right]\right]-8\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]\text{Log}\left[-2\,i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]-\text{ArcTanh}[x]\right]\right]+$$
$$\left.8\,\text{ArcTanh}[x]\,\text{Log}\left[-2\,i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]-\text{ArcTanh}[x]\right]\right]+4\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}\left[\frac{1}{\sqrt{2}}\right]-2\,\text{ArcTanh}[x]}\right]+4\,\text{PolyLog}\left[2,-e^{2\,\text{ArcTanh}[x]}\right]\right)$$

Problem 26: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 325 leaves, 19 steps):

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

Result (type 4, 285 leaves):

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

Problem 30: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 22 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 34: Attempted integration timed out after 120 seconds.

$$\int \frac{a + b\,\text{ArcTanh}\left[c\,x^3\right]}{d + e\,x}\,dx$$

Optimal (type 4, 523 leaves, 25 steps):

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

Result (type 1, 1 leaves):

???

Problem 44: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 460 leaves, 20 steps):

$$-\frac{b\,d\,\sqrt{x}}{c\,e^2}+\frac{b\,\sqrt{x}}{2\,c^3\,e}+\frac{b\,x^{3/2}}{6\,c\,e}+\frac{b\,d\,\text{ArcTanh}[c\,\sqrt{x}]}{c^2\,e^2}-\frac{b\,\text{ArcTanh}[c\,\sqrt{x}]}{2\,c^4\,e}-$$
$$\frac{d\,x\,(a+b\,\text{ArcTanh}[c\,\sqrt{x}])}{e^2}+\frac{x^2\,(a+b\,\text{ArcTanh}[c\,\sqrt{x}])}{2\,e}-\frac{2\,d^2\,(a+b\,\text{ArcTanh}[c\,\sqrt{x}])\,\text{Log}[\frac{2}{1+c\,\sqrt{x}}]}{e^3}+$$
$$\frac{d^2\,(a+b\,\text{ArcTanh}[c\,\sqrt{x}])\,\text{Log}[\frac{2\,c\,(\sqrt{-d}-\sqrt{e}\,\sqrt{x})}{(c\,\sqrt{-d}-\sqrt{e})\,(1+c\,\sqrt{x})}]}{e^3}+\frac{d^2\,(a+b\,\text{ArcTanh}[c\,\sqrt{x}])\,\text{Log}[\frac{2\,c\,(\sqrt{-d}+\sqrt{e}\,\sqrt{x})}{(c\,\sqrt{-d}+\sqrt{e})\,(1+c\,\sqrt{x})}]}{e^3}+$$
$$\frac{b\,d^2\,\text{PolyLog}[2,1-\frac{2}{1+c\,\sqrt{x}}]}{e^3}-\frac{b\,d^2\,\text{PolyLog}[2,1-\frac{2\,c\,(\sqrt{-d}-\sqrt{e}\,\sqrt{x})}{(c\,\sqrt{-d}-\sqrt{e})\,(1+c\,\sqrt{x})}]}{2\,e^3}-\frac{b\,d^2\,\text{PolyLog}[2,1-\frac{2\,c\,(\sqrt{-d}+\sqrt{e}\,\sqrt{x})}{(c\,\sqrt{-d}+\sqrt{e})\,(1+c\,\sqrt{x})}]}{2\,e^3}$$

Result (type 4, 558 leaves):

$$\frac{1}{6\,e^3}\Bigg(-6\,a\,d\,e\,x+3\,a\,e^2\,x^2+6\,a\,d^2\,\text{Log}[d+e\,x]+$$
$$\frac{1}{c^4}b\Bigg(2\,c\,e\,(-3\,c^2\,d+2\,e)\,\sqrt{x}+c\,e^2\,\sqrt{x}\,(-1+c^2\,x)-6\,(c^2\,d-e)\,e\,(-1+c^2\,x)\,\text{ArcTanh}[c\,\sqrt{x}]+3\,e^2\,(-1+c^2\,x)^2\,\text{ArcTanh}[c\,\sqrt{x}]-$$
$$6\,c^4\,d^2\,\Big(\text{ArcTanh}[c\,\sqrt{x}]\,\Big(\text{ArcTanh}[c\,\sqrt{x}]+2\,\text{Log}[1+e^{-2\,\text{ArcTanh}[c\,\sqrt{x}]}]\Big)-\text{PolyLog}[2,-e^{-2\,\text{ArcTanh}[c\,\sqrt{x}]}]\Big)+$$
$$3\,c^4\,d^2\,\Bigg(2\,\text{ArcTanh}[c\,\sqrt{x}]^2-4\,i\,\text{ArcSin}[\sqrt{\frac{c^2\,d}{c^2\,d+e}}]\,\text{ArcTanh}[\frac{c\,e\,\sqrt{x}}{\sqrt{-c^2\,d\,e}}]+$$
$$2\,\Big(-i\,\text{ArcSin}[\sqrt{\frac{c^2\,d}{c^2\,d+e}}]+\text{ArcTanh}[c\,\sqrt{x}]\Big)\,\text{Log}[\frac{e^{-2\,\text{ArcTanh}[c\,\sqrt{x}]}\,\Big(-2\,\sqrt{-c^2\,d\,e}+e\,(-1+e^{2\,\text{ArcTanh}[c\,\sqrt{x}]})+c^2\,d\,(1+e^{2\,\text{ArcTanh}[c\,\sqrt{x}]})\Big)}{c^2\,d+e}]+$$
$$2\,\Big(i\,\text{ArcSin}[\sqrt{\frac{c^2\,d}{c^2\,d+e}}]+\text{ArcTanh}[c\,\sqrt{x}]\Big)\,\text{Log}[\frac{e^{-2\,\text{ArcTanh}[c\,\sqrt{x}]}\,\Big(2\,\sqrt{-c^2\,d\,e}+e\,(-1+e^{2\,\text{ArcTanh}[c\,\sqrt{x}]})+c^2\,d\,(1+e^{2\,\text{ArcTanh}[c\,\sqrt{x}]})\Big)}{c^2\,d+e}]-$$
$$\text{PolyLog}[2,\frac{(-c^2\,d+e-2\,\sqrt{-c^2\,d\,e})\,e^{-2\,\text{ArcTanh}[c\,\sqrt{x}]}}{c^2\,d+e}]-\text{PolyLog}[2,\frac{(-c^2\,d+e+2\,\sqrt{-c^2\,d\,e})\,e^{-2\,\text{ArcTanh}[c\,\sqrt{x}]}}{c^2\,d+e}]\Bigg)\Bigg)\Bigg)$$

Problem 45: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 374 leaves, 15 steps):

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

Result (type 4, 568 leaves):

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

Problem 46: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 318 leaves, 11 steps):

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

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

Result (type 4, 551 leaves) :

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

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

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

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

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

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

Problem 47: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 358 leaves, 15 steps) :

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

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

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

Result (type 4, 563 leaves) :

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

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

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

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

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

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

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

Problem 48: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 413 leaves, 19 steps):

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

Result (type 4, 567 leaves):

$$-\frac{1}{2 d^2 x}\Bigg(2 a d + 2 a e x \operatorname{Log}[x] - 2 a e x \operatorname{Log}[d + e x] +$$

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

$$b e x \Bigg(-2 \Bigg(\operatorname{ArcTanh}[c \sqrt{x}]^2 -$$

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

$$\operatorname{Log}\left[\frac{e^{-2 \operatorname{ArcTanh}[c \sqrt{x}]} \left(2 \sqrt{-c^2 d e} + e \left(-1 + e^{2 \operatorname{ArcTanh}[c \sqrt{x}]}\right) + c^2 d \left(1 + e^{2 \operatorname{ArcTanh}[c \sqrt{x}]}\right)\right)}{c^2 d + e}\right]\Bigg) +$$

$$\operatorname{ArcTanh}[c \sqrt{x}] \Bigg(\operatorname{Log}\left[\frac{e^{-2 \operatorname{ArcTanh}[c \sqrt{x}]} \left(-2 \sqrt{-c^2 d e} + e \left(-1 + e^{2 \operatorname{ArcTanh}[c \sqrt{x}]}\right) + c^2 d \left(1 + e^{2 \operatorname{ArcTanh}[c \sqrt{x}]}\right)\right)}{c^2 d + e}\right] +$$

$$\operatorname{Log}\left[\frac{e^{-2 \operatorname{ArcTanh}[c \sqrt{x}]} \left(2 \sqrt{-c^2 d e} + e \left(-1 + e^{2 \operatorname{ArcTanh}[c \sqrt{x}]}\right) + c^2 d \left(1 + e^{2 \operatorname{ArcTanh}[c \sqrt{x}]}\right)\right)}{c^2 d + e}\right]\Bigg)\Bigg) +$$

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

Problem 49: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 506 leaves, 24 steps) :

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

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

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

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

Result (type 4, 626 leaves) :

$$-\frac{1}{6\,d^3\,x^2}\Bigg(3\,a\,d^2-6\,a\,d\,e\,x-6\,a\,e^2\,x^2\,\text{Log}[x]+6\,a\,e^2\,x^2\,\text{Log}[d+e\,x]+$$

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

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

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

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

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

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

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

Test results for the 538 problems in "7.3.4 u (a+b arctanh(c x))^p.m"

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

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

Optimal (type 3, 44 leaves, 4 steps):

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

Result (type 3, 95 leaves):

$$a\,d\,x+\frac{b\,d\,x}{2}+\frac{1}{2}\,a\,c\,d\,x^2+b\,d\,x\,\text{ArcTanh}[c\,x]+\frac{1}{2}\,b\,c\,d\,x^2\,\text{ArcTanh}[c\,x]+\frac{b\,d\,\text{Log}[1-c\,x]}{4\,c}-\frac{b\,d\,\text{Log}[1+c\,x]}{4\,c}+\frac{b\,d\,\text{Log}\left[1-c^2\,x^2\right]}{2\,c}$$

Problem 72: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 191 leaves, 13 steps):

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

Result (type 4, 228 leaves):

$$d\left(a^2\,c\,x+a^2\,\text{Log}[c\,x]+a\,b\,\left(2\,c\,x\,\text{ArcTanh}[c\,x]+\text{Log}\left[1-c^2\,x^2\right]\right)+b^2\left(\text{ArcTanh}[c\,x]\,\left((-1+c\,x)\,\text{ArcTanh}[c\,x]-2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)+\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)+a\,b\,(-\text{PolyLog}[2,-c\,x]+\text{PolyLog}[2,c\,x])+b^2\left(\frac{i\,\pi^3}{24}-\frac{2}{3}\,\text{ArcTanh}[c\,x]^3-\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]+\frac{1}{2}\,\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}[c\,x]}\right]-\frac{1}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)\right)$$

Problem 73: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 201 leaves, 12 steps):

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

Result (type 4, 249 leaves):

$$-\frac{1}{x}d\Big(a^2-a^2\,c\,x\,\text{Log}[x]+a\,b\,\big(2\,\text{ArcTanh}[c\,x]+c\,x\,\big(-2\,\text{Log}[c\,x]+\text{Log}\left[1-c^2\,x^2\right]\big)\big)+b^2\,\big(\text{ArcTanh}[c\,x]\,\big((1-c\,x)\,\text{ArcTanh}[c\,x]-2\,c\,x\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]\big)+c\,x\,\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]\big)+a\,b\,c\,x\,(\text{PolyLog}[2,-c\,x]-\text{PolyLog}[2,c\,x])-b^2\,c\,x\,\Big(\frac{i\,\pi^3}{24}-\frac{2}{3}\,\text{ArcTanh}[c\,x]^3-\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]+\frac{1}{2}\,\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}[c\,x]}\right]-\frac{1}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\Big)\Big)$$

Problem 80: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 278 leaves, 19 steps):

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

Result (type 4, 324 leaves):

$$\frac{1}{2} d^2 \left(4 a^2 c x + a^2 c^2 x^2 + 2 a^2 \text{Log}[c x] + a b \left(2 c x + 2 c^2 x^2 \text{ArcTanh}[c x] + \text{Log}[1 - c x] - \text{Log}[1 + c x]\right) + 4 a b \left(2 c x \text{ArcTanh}[c x] + \text{Log}\left[1 - c^2 x^2\right]\right) + b^2 \left(2 c x \text{ArcTanh}[c x] + \left(-1 + c^2 x^2\right) \text{ArcTanh}[c x]^2 + \text{Log}\left[1 - c^2 x^2\right]\right) + 4 b^2 \left(\text{ArcTanh}[c x] \left(\left(-1 + c x\right) \text{ArcTanh}[c x] - 2 \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x]}\right]\right) + \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c x]}\right]\right) + 2 a b \left(-\text{PolyLog}[2, -c x] + \text{PolyLog}[2, c x]\right) + 2 b^2 \left(\frac{i \pi^3}{24} - \frac{2}{3} \text{ArcTanh}[c x]^3 - \text{ArcTanh}[c x]^2 \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x]}\right] + \text{ArcTanh}[c x]^2 \text{Log}\left[1 - e^{2 \text{ArcTanh}[c x]}\right] + \text{ArcTanh}[c x] \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c x]}\right] + \text{ArcTanh}[c x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x]}\right] + \frac{1}{2} \text{PolyLog}\left[3, -e^{-2 \text{ArcTanh}[c x]}\right] - \frac{1}{2} \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x]}\right]\right)\right)$$

Problem 81: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 283 leaves, 17 steps):

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

Result (type 4, 341 leaves):

$$\frac{1}{12 x} d^2 \left(-12 a^2 + i b^2 c \pi^3 x + 12 a^2 c^2 x^2 - 24 a b \text{ArcTanh}[c x] + 24 a b c^2 x^2 \text{ArcTanh}[c x] - 12 b^2 \text{ArcTanh}[c x]^2 + 12 b^2 c^2 x^2 \text{ArcTanh}[c x]^2 - 16 b^2 c x \text{ArcTanh}[c x]^3 + 24 b^2 c x \text{ArcTanh}[c x] \text{Log}\left[1 - e^{-2 \text{ArcTanh}[c x]}\right] - 24 b^2 c x \text{ArcTanh}[c x] \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x]}\right] - 24 b^2 c x \text{ArcTanh}[c x]^2 \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x]}\right] + 24 b^2 c x \text{ArcTanh}[c x]^2 \text{Log}\left[1 - e^{2 \text{ArcTanh}[c x]}\right] + 24 a^2 c x \text{Log}[x] + 24 a b c x \text{Log}[c x] + 12 b^2 c x (1 + 2 \text{ArcTanh}[c x]) \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c x]}\right] - 12 b^2 c x \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x]}\right] + 24 b^2 c x \text{ArcTanh}[c x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x]}\right] - 24 a b c x \text{PolyLog}[2, -c x] + 24 a b c x \text{PolyLog}[2, c x] + 12 b^2 c x \text{PolyLog}\left[3, -e^{-2 \text{ArcTanh}[c x]}\right] - 12 b^2 c x \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x]}\right]\right)$$

Problem 82: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 313 leaves, 20 steps):

$$-\frac{b c d^2 (a+b \operatorname{ArcTanh}[c x])}{x}+\frac{5}{2} c^2 d^2 (a+b \operatorname{ArcTanh}[c x])^2-\frac{d^2 (a+b \operatorname{ArcTanh}[c x])^2}{2 x^2}-\frac{2 c d^2 (a+b \operatorname{ArcTanh}[c x])^2}{x}+2 c^2 d^2 (a+b \operatorname{ArcTanh}[c x])^2 \operatorname{ArcTanh}\left[1-\frac{2}{1-c x}\right]+b^2 c^2 d^2 \operatorname{Log}[x]-\frac{1}{2} b^2 c^2 d^2 \operatorname{Log}\left[1-c^2 x^2\right]+4 b c^2 d^2 (a+b \operatorname{ArcTanh}[c x]) \operatorname{Log}\left[2-\frac{2}{1+c x}\right]-b c^2 d^2 (a+b \operatorname{ArcTanh}[c x]) \operatorname{PolyLog}\left[2,1-\frac{2}{1-c x}\right]+b c^2 d^2 (a+b \operatorname{ArcTanh}[c x]) \operatorname{PolyLog}\left[2,-1+\frac{2}{1-c x}\right]-2 b^2 c^2 d^2 \operatorname{PolyLog}\left[2,-1+\frac{2}{1+c x}\right]+\frac{1}{2} b^2 c^2 d^2 \operatorname{PolyLog}\left[3,1-\frac{2}{1-c x}\right]-\frac{1}{2} b^2 c^2 d^2 \operatorname{PolyLog}\left[3,-1+\frac{2}{1-c x}\right]$$

Result (type 4, 370 leaves):

$$-\frac{1}{2 x^2} d^2 \Big(a^2+4 a^2 c x-2 a^2 c^2 x^2 \operatorname{Log}[x]+a b (2 \operatorname{ArcTanh}[c x]+c x (2+c x \operatorname{Log}[1-c x]-c x \operatorname{Log}[1+c x]))+b^2 \left(2 c x \operatorname{ArcTanh}[c x]+(1-c^2 x^2) \operatorname{ArcTanh}[c x]^2-2 c^2 x^2 \operatorname{Log}\left[\frac{c x}{\sqrt{1-c^2 x^2}}\right]\right)+4 a b c x \left(2 \operatorname{ArcTanh}[c x]+c x \left(-2 \operatorname{Log}[c x]+\operatorname{Log}\left[1-c^2 x^2\right]\right)\right)+4 b^2 c x \left(\operatorname{ArcTanh}[c x] \left((1-c x) \operatorname{ArcTanh}[c x]-2 c x \operatorname{Log}\left[1-e^{-2 \operatorname{ArcTanh}[c x]}\right]\right)+c x \operatorname{PolyLog}\left[2,e^{-2 \operatorname{ArcTanh}[c x]}\right]\right)+2 a b c^2 x^2 (\operatorname{PolyLog}[2,-c x]-\operatorname{PolyLog}[2,c x])-2 b^2 c^2 x^2 \Big(\frac{i \pi^3}{24}-\frac{2}{3} \operatorname{ArcTanh}[c x]^3-\operatorname{ArcTanh}[c x]^2 \operatorname{Log}\left[1+e^{-2 \operatorname{ArcTanh}[c x]}\right]+\operatorname{ArcTanh}[c x]^2 \operatorname{Log}\left[1-e^{2 \operatorname{ArcTanh}[c x]}\right]+\operatorname{ArcTanh}[c x] \operatorname{PolyLog}\left[2,-e^{-2 \operatorname{ArcTanh}[c x]}\right]+\operatorname{ArcTanh}[c x] \operatorname{PolyLog}\left[2,e^{2 \operatorname{ArcTanh}[c x]}\right]+\frac{1}{2} \operatorname{PolyLog}\left[3,-e^{-2 \operatorname{ArcTanh}[c x]}\right]-\frac{1}{2} \operatorname{PolyLog}\left[3,e^{2 \operatorname{ArcTanh}[c x]}\right]\Big)\Big)$$

Problem 88: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 355 leaves, 28 steps):

$$3 a b c d^3 x+\frac{1}{3} b^2 c d^3 x-\frac{1}{3} b^2 d^3 \operatorname{ArcTanh}[c x]+3 b^2 c d^3 x \operatorname{ArcTanh}[c x]+\frac{1}{3} b c^2 d^3 x^2 (a+b \operatorname{ArcTanh}[c x])+\frac{11}{6} d^3 (a+b \operatorname{ArcTanh}[c x])^2+3 c d^3 x (a+b \operatorname{ArcTanh}[c x])^2+\frac{3}{2} c^2 d^3 x^2 (a+b \operatorname{ArcTanh}[c x])^2+\frac{1}{3} c^3 d^3 x^3 (a+b \operatorname{ArcTanh}[c x])^2+2 d^3 (a+b \operatorname{ArcTanh}[c x])^2 \operatorname{ArcTanh}\left[1-\frac{2}{1-c x}\right]-\frac{20}{3} b d^3 (a+b \operatorname{ArcTanh}[c x]) \operatorname{Log}\left[\frac{2}{1-c x}\right]+\frac{3}{2} b^2 d^3 \operatorname{Log}\left[1-c^2 x^2\right]-\frac{10}{3} b^2 d^3 \operatorname{PolyLog}\left[2,1-\frac{2}{1-c x}\right]-b d^3 (a+b \operatorname{ArcTanh}[c x]) \operatorname{PolyLog}\left[2,1-\frac{2}{1-c x}\right]+b d^3 (a+b \operatorname{ArcTanh}[c x]) \operatorname{PolyLog}\left[2,-1+\frac{2}{1-c x}\right]+\frac{1}{2} b^2 d^3 \operatorname{PolyLog}\left[3,1-\frac{2}{1-c x}\right]-\frac{1}{2} b^2 d^3 \operatorname{PolyLog}\left[3,-1+\frac{2}{1-c x}\right]$$

Result (type 4, 448 leaves):

$$\frac{1}{24} d^3 \left(i b^2 \pi^3 + 72 a^2 c x + 72 a b c x + 8 b^2 c x + 36 a^2 c^2 x^2 + 8 a b c^2 x^2 + 8 a^2 c^3 x^3 - 8 b^2 \text{ArcTanh}[c x] + 144 a b c x \text{ArcTanh}[c x] + 72 b^2 c x \text{ArcTanh}[c x] + 72 a b c^2 x^2 \text{ArcTanh}[c x] + 8 b^2 c^2 x^2 \text{ArcTanh}[c x] + 16 a b c^3 x^3 \text{ArcTanh}[c x] - 116 b^2 \text{ArcTanh}[c x]^2 + 72 b^2 c x \text{ArcTanh}[c x]^2 + 36 b^2 c^2 x^2 \text{ArcTanh}[c x]^2 + 8 b^2 c^3 x^3 \text{ArcTanh}[c x]^2 - 16 b^2 \text{ArcTanh}[c x]^3 - 160 b^2 \text{ArcTanh}[c x] \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x]}\right] - 24 b^2 \text{ArcTanh}[c x]^2 \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x]}\right] + 24 b^2 \text{ArcTanh}[c x]^2 \text{Log}\left[1 - e^{2 \text{ArcTanh}[c x]}\right] + 24 a^2 \text{Log}[c x] + 36 a b \text{Log}[1 - c x] - 36 a b \text{Log}[1 + c x] + 72 a b \text{Log}\left[1 - c^2 x^2\right] + 36 b^2 \text{Log}\left[1 - c^2 x^2\right] + 8 a b \text{Log}\left[-1 + c^2 x^2\right] + 8 b^2 (10 + 3 \text{ArcTanh}[c x]) \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c x]}\right] + 24 b^2 \text{ArcTanh}[c x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x]}\right] - 24 a b \text{PolyLog}[2, -c x] + 24 a b \text{PolyLog}[2, c x] + 12 b^2 \text{PolyLog}\left[3, -e^{-2 \text{ArcTanh}[c x]}\right] - 12 b^2 \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x]}\right]\right)$$

Problem 89: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 361 leaves, 23 steps):

$$a b c^2 d^3 x + b^2 c^2 d^3 x \text{ArcTanh}[c x] + \frac{7}{2} c d^3 (a + b \text{ArcTanh}[c x])^2 - \frac{d^3 (a + b \text{ArcTanh}[c x])^2}{x} + 3 c^2 d^3 x (a + b \text{ArcTanh}[c x])^2 + \frac{1}{2} c^3 d^3 x^2 (a + b \text{ArcTanh}[c x])^2 + 6 c d^3 (a + b \text{ArcTanh}[c x])^2 \text{ArcTanh}\left[1 - \frac{2}{1 - c x}\right] - 6 b c d^3 (a + b \text{ArcTanh}[c x]) \text{Log}\left[\frac{2}{1 - c x}\right] + \frac{1}{2} b^2 c d^3 \text{Log}\left[1 - c^2 x^2\right] + 2 b c d^3 (a + b \text{ArcTanh}[c x]) \text{Log}\left[2 - \frac{2}{1 + c x}\right] - 3 b^2 c d^3 \text{PolyLog}\left[2, 1 - \frac{2}{1 - c x}\right] - 3 b c d^3 (a + b \text{ArcTanh}[c x]) \text{PolyLog}\left[2, 1 - \frac{2}{1 - c x}\right] + 3 b c d^3 (a + b \text{ArcTanh}[c x]) \text{PolyLog}\left[2, -1 + \frac{2}{1 - c x}\right] - b^2 c d^3 \text{PolyLog}\left[2, -1 + \frac{2}{1 + c x}\right] + \frac{3}{2} b^2 c d^3 \text{PolyLog}\left[3, 1 - \frac{2}{1 - c x}\right] - \frac{3}{2} b^2 c d^3 \text{PolyLog}\left[3, -1 + \frac{2}{1 - c x}\right]$$

Result (type 4, 479 leaves):

$$\frac{1}{8 x} d^3 \left(-8 a^2 + i b^2 c \pi^3 x + 24 a^2 c^2 x^2 + 8 a b c^2 x^2 + 4 a^2 c^3 x^3 - 16 a b \text{ArcTanh}[c x] + 48 a b c^2 x^2 \text{ArcTanh}[c x] + 8 b^2 c^2 x^2 \text{ArcTanh}[c x] + 8 a b c^3 x^3 \text{ArcTanh}[c x] - 8 b^2 \text{ArcTanh}[c x]^2 - 20 b^2 c x \text{ArcTanh}[c x]^2 + 24 b^2 c^2 x^2 \text{ArcTanh}[c x]^2 + 4 b^2 c^3 x^3 \text{ArcTanh}[c x]^2 - 16 b^2 c x \text{ArcTanh}[c x]^3 + 16 b^2 c x \text{ArcTanh}[c x] \text{Log}\left[1 - e^{-2 \text{ArcTanh}[c x]}\right] - 48 b^2 c x \text{ArcTanh}[c x] \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x]}\right] - 24 b^2 c x \text{ArcTanh}[c x]^2 \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c x]}\right] + 24 b^2 c x \text{ArcTanh}[c x]^2 \text{Log}\left[1 - e^{2 \text{ArcTanh}[c x]}\right] + 24 a^2 c x \text{Log}[x] + 16 a b c x \text{Log}[c x] + 4 a b c x \text{Log}[1 - c x] - 4 a b c x \text{Log}[1 + c x] + 16 a b c x \text{Log}\left[1 - c^2 x^2\right] + 4 b^2 c x \text{Log}\left[1 - c^2 x^2\right] + 24 b^2 c x (1 + \text{ArcTanh}[c x]) \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c x]}\right] - 8 b^2 c x \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x]}\right] + 24 b^2 c x \text{ArcTanh}[c x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x]}\right] - 24 a b c x \text{PolyLog}[2, -c x] + 24 a b c x \text{PolyLog}[2, c x] + 12 b^2 c x \text{PolyLog}\left[3, -e^{-2 \text{ArcTanh}[c x]}\right] - 12 b^2 c x \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x]}\right]\right)$$

Problem 90: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 385 leaves, 25 steps):

$$-\frac{b\,c\,d^3\,(a + b\,\text{ArcTanh}[c\,x])}{x} + \frac{9}{2}\,c^2\,d^3\,(a + b\,\text{ArcTanh}[c\,x])^2 - \frac{d^3\,(a + b\,\text{ArcTanh}[c\,x])^2}{2\,x^2} - \frac{3\,c\,d^3\,(a + b\,\text{ArcTanh}[c\,x])^2}{x} + c^3\,d^3\,x\,(a + b\,\text{ArcTanh}[c\,x])^2 + 6\,c^2\,d^3\,(a + b\,\text{ArcTanh}[c\,x])^2\,\text{ArcTanh}\left[1 - \frac{2}{1 - c\,x}\right] + b^2\,c^2\,d^3\,\text{Log}[x] - 2\,b\,c^2\,d^3\,(a + b\,\text{ArcTanh}[c\,x])\,\text{Log}\left[\frac{2}{1 - c\,x}\right] - \frac{1}{2}\,b^2\,c^2\,d^3\,\text{Log}\left[1 - c^2\,x^2\right] + 6\,b\,c^2\,d^3\,(a + b\,\text{ArcTanh}[c\,x])\,\text{Log}\left[2 - \frac{2}{1 + c\,x}\right] - b^2\,c^2\,d^3\,\text{PolyLog}\left[2, 1 - \frac{2}{1 - c\,x}\right] - 3\,b\,c^2\,d^3\,(a + b\,\text{ArcTanh}[c\,x])\,\text{PolyLog}\left[2, 1 - \frac{2}{1 - c\,x}\right] + 3\,b\,c^2\,d^3\,(a + b\,\text{ArcTanh}[c\,x])\,\text{PolyLog}\left[2, -1 + \frac{2}{1 - c\,x}\right] - 3\,b^2\,c^2\,d^3\,\text{PolyLog}\left[2, -1 + \frac{2}{1 + c\,x}\right] + \frac{3}{2}\,b^2\,c^2\,d^3\,\text{PolyLog}\left[3, 1 - \frac{2}{1 - c\,x}\right] - \frac{3}{2}\,b^2\,c^2\,d^3\,\text{PolyLog}\left[3, -1 + \frac{2}{1 - c\,x}\right]$$

Result (type 4, 461 leaves):

$$\frac{1}{2}\,d^3\left(-\frac{a^2}{x^2} - \frac{6\,a^2\,c}{x} + 2\,a^2\,c^3\,x + 6\,a^2\,c^2\,\text{Log}[x] - \frac{a\,b\,(2\,\text{ArcTanh}[c\,x] + c\,x\,(2 + c\,x\,\text{Log}[1 - c\,x] - c\,x\,\text{Log}[1 + c\,x]))}{x^2} + \frac{b^2\left(-2\,c\,x\,\text{ArcTanh}[c\,x] + (-1 + c^2\,x^2)\,\text{ArcTanh}[c\,x]^2 + 2\,c^2\,x^2\,\text{Log}\left[\frac{c\,x}{\sqrt{1-c^2\,x^2}}\right]\right)}{x^2} + 2\,a\,b\,c^2\,\left(2\,c\,x\,\text{ArcTanh}[c\,x] + \text{Log}\left[1 - c^2\,x^2\right]\right) - \frac{6\,a\,b\,c\,\left(2\,\text{ArcTanh}[c\,x] + c\,x\,\left(-2\,\text{Log}[c\,x] + \text{Log}\left[1 - c^2\,x^2\right]\right)\right)}{x} + 2\,b^2\,c^2\,\left(\text{ArcTanh}[c\,x]\,\left((-1 + c\,x)\,\text{ArcTanh}[c\,x] - 2\,\text{Log}\left[1 + e^{-2\,\text{ArcTanh}[c\,x]}\right]\right) + \text{PolyLog}\left[2, -e^{-2\,\text{ArcTanh}[c\,x]}\right]\right) + \frac{1}{x}\,6\,b^2\,c\,\left(\text{ArcTanh}[c\,x]\,\left((-1 + c\,x)\,\text{ArcTanh}[c\,x] + 2\,c\,x\,\text{Log}\left[1 - e^{-2\,\text{ArcTanh}[c\,x]}\right]\right) - c\,x\,\text{PolyLog}\left[2, e^{-2\,\text{ArcTanh}[c\,x]}\right]\right) - 6\,a\,b\,c^2\,(\text{PolyLog}[2, -c\,x] - \text{PolyLog}[2, c\,x]) + 6\,b^2\,c^2\left(\frac{i\,\pi^3}{24} - \frac{2}{3}\,\text{ArcTanh}[c\,x]^3 - \text{ArcTanh}[c\,x]^2\,\text{Log}\left[1 + e^{-2\,\text{ArcTanh}[c\,x]}\right] + \text{ArcTanh}[c\,x]^2\,\text{Log}\left[1 - e^{2\,\text{ArcTanh}[c\,x]}\right] + \text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2, -e^{-2\,\text{ArcTanh}[c\,x]}\right] + \text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2, e^{2\,\text{ArcTanh}[c\,x]}\right] + \frac{1}{2}\,\text{PolyLog}\left[3, -e^{-2\,\text{ArcTanh}[c\,x]}\right] - \frac{1}{2}\,\text{PolyLog}\left[3, e^{2\,\text{ArcTanh}[c\,x]}\right]\right)\right)$$

Problem 91: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(d + c\,d\,x)^3\,(a + b\,\text{ArcTanh}[c\,x])^2}{x^4}\,dx$$

Optimal (type 4, 396 leaves, 28 steps):

$$-\frac{b^2 c^2 d^3}{3\,x} + \frac{1}{3} b^2 c^3 d^3\,\text{ArcTanh}[c\,x] - \frac{b\,c\,d^3\,(a + b\,\text{ArcTanh}[c\,x])}{3\,x^2} - \frac{3\,b\,c^2 d^3\,(a + b\,\text{ArcTanh}[c\,x])}{x} + \frac{29}{6} c^3 d^3\,(a + b\,\text{ArcTanh}[c\,x])^2 - \frac{d^3\,(a + b\,\text{ArcTanh}[c\,x])^2}{3\,x^3} - \frac{3\,c\,d^3\,(a + b\,\text{ArcTanh}[c\,x])^2}{2\,x^2} - \frac{3\,c^2 d^3\,(a + b\,\text{ArcTanh}[c\,x])^2}{x} + 2\,c^3 d^3\,(a + b\,\text{ArcTanh}[c\,x])^2\,\text{ArcTanh}\left[1 - \frac{2}{1 - c\,x}\right] + 3\,b^2 c^3 d^3\,\text{Log}[x] - \frac{3}{2} b^2 c^3 d^3\,\text{Log}\left[1 - c^2 x^2\right] + \frac{20}{3} b\,c^3 d^3\,(a + b\,\text{ArcTanh}[c\,x])\,\text{Log}\left[2 - \frac{2}{1 + c\,x}\right] - b\,c^3 d^3\,(a + b\,\text{ArcTanh}[c\,x])\,\text{PolyLog}\left[2,\,1 - \frac{2}{1 - c\,x}\right] + b\,c^3 d^3\,(a + b\,\text{ArcTanh}[c\,x])\,\text{PolyLog}\left[2,\,-1 + \frac{2}{1 - c\,x}\right] - \frac{10}{3} b^2 c^3 d^3\,\text{PolyLog}\left[2,\,-1 + \frac{2}{1 + c\,x}\right] + \frac{1}{2} b^2 c^3 d^3\,\text{PolyLog}\left[3,\,1 - \frac{2}{1 - c\,x}\right] - \frac{1}{2} b^2 c^3 d^3\,\text{PolyLog}\left[3,\,-1 + \frac{2}{1 - c\,x}\right]$$

Result (type 4, 569 leaves):

$$\frac{1}{24\,x^3} d^3 \Big(-8\,a^2 - 36\,a^2 c\,x - 8\,a\,b\,c\,x - 72\,a^2 c^2 x^2 - 72\,a\,b\,c^2 x^2 - 8\,b^2 c^2 x^2 + i\,b^2 c^3 \pi^3 x^3 - 16\,a\,b\,\text{ArcTanh}[c\,x] - 72\,a\,b\,c\,x\,\text{ArcTanh}[c\,x] - 8\,b^2 c\,x\,\text{ArcTanh}[c\,x] - 144\,a\,b\,c^2 x^2\,\text{ArcTanh}[c\,x] - 72\,b^2 c^2 x^2\,\text{ArcTanh}[c\,x] + 8\,b^2 c^3 x^3\,\text{ArcTanh}[c\,x] - 8\,b^2\,\text{ArcTanh}[c\,x]^2 - 36\,b^2 c\,x\,\text{ArcTanh}[c\,x]^2 - 72\,b^2 c^2 x^2\,\text{ArcTanh}[c\,x]^2 + 116\,b^2 c^3 x^3\,\text{ArcTanh}[c\,x]^2 - 16\,b^2 c^3 x^3\,\text{ArcTanh}[c\,x]^3 + 160\,b^2 c^3 x^3\,\text{ArcTanh}[c\,x]\,\text{Log}\left[1 - e^{-2\,\text{ArcTanh}[c\,x]}\right] - 24\,b^2 c^3 x^3\,\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1 + e^{-2\,\text{ArcTanh}[c\,x]}\right] + 24\,b^2 c^3 x^3\,\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1 - e^{2\,\text{ArcTanh}[c\,x]}\right] + 24\,a^2 c^3 x^3\,\text{Log}[x] + 160\,a\,b\,c^3 x^3\,\text{Log}[c\,x] - 36\,a\,b\,c^3 x^3\,\text{Log}[1 - c\,x] + 36\,a\,b\,c^3 x^3\,\text{Log}[1 + c\,x] + 72\,b^2 c^3 x^3\,\text{Log}\left[\frac{c\,x}{\sqrt{1 - c^2 x^2}}\right] - 80\,a\,b\,c^3 x^3\,\text{Log}\left[1 - c^2 x^2\right] + 24\,b^2 c^3 x^3\,\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,\,-e^{-2\,\text{ArcTanh}[c\,x]}\right] - 80\,b^2 c^3 x^3\,\text{PolyLog}\left[2,\,e^{-2\,\text{ArcTanh}[c\,x]}\right] + 24\,b^2 c^3 x^3\,\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcTanh}[c\,x]}\right] - 24\,a\,b\,c^3 x^3\,\text{PolyLog}[2,\,-c\,x] + 24\,a\,b\,c^3 x^3\,\text{PolyLog}[2,\,c\,x] + 12\,b^2 c^3 x^3\,\text{PolyLog}\left[3,\,-e^{-2\,\text{ArcTanh}[c\,x]}\right] - 12\,b^2 c^3 x^3\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcTanh}[c\,x]}\right]\Big)$$

Problem 99: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 77 leaves, 3 steps):

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

Result (type 4, 132 leaves):

$$\frac{1}{d}\left(a^2\,\text{Log}[c\,x]-a^2\,\text{Log}[1+c\,x]+a\,b\,\left(2\,\text{ArcTanh}[c\,x]\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]-\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)+\right.$$
$$\left.b^2\left(\frac{i\,\pi^3}{24}-\frac{2}{3}\,\text{ArcTanh}[c\,x]^3+\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]-\frac{1}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)\right)$$

Problem 100: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 162 leaves, 8 steps):

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

Result (type 4, 225 leaves):

$$\frac{1}{d}\left(-\frac{a^2}{x}-a^2\,c\,\text{Log}[x]+a^2\,c\,\text{Log}[1+c\,x]+\frac{1}{x}\right.$$
$$a\,b\left(-2\,\text{ArcTanh}[c\,x]\,\left(1+c\,x\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)+2\,c\,x\,\text{Log}\left[\frac{c\,x}{\sqrt{1-c^2\,x^2}}\right]+c\,x\,\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)+$$
$$b^2\,c\left(-\frac{i\,\pi^3}{24}+\text{ArcTanh}[c\,x]^2-\frac{\text{ArcTanh}[c\,x]^2}{c\,x}+\frac{2}{3}\,\text{ArcTanh}[c\,x]^3+2\,\text{ArcTanh}[c\,x]\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]-\right.$$
$$\left.\left.\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]-\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]-\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]+\frac{1}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)\right)$$

Problem 101: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 250 leaves, 17 steps):

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

Result (type 4, 317 leaves):

$$\frac{1}{2\,d}\left(-\frac{a^2}{x^2}+\frac{2\,a^2\,c}{x}+2\,a^2\,c^2\,\text{Log}[x]-2\,a^2\,c^2\,\text{Log}[1+c\,x]+\frac{1}{x^2}2\,a\,b\left(\text{ArcTanh}[c\,x]\left(-1+2\,c\,x+c^2\,x^2+2\,c^2\,x^2\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)-c\,x\left(1+2\,c\,x\,\text{Log}\left[\frac{c\,x}{\sqrt{1-c^2\,x^2}}\right]\right)-c^2\,x^2\,\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)+2\,b^2\,c^2\left(\frac{i\,\pi^3}{24}-\frac{\text{ArcTanh}[c\,x]}{c\,x}-\frac{1}{2}\text{ArcTanh}[c\,x]^2-\frac{\text{ArcTanh}[c\,x]^2}{2\,c^2\,x^2}+\frac{\text{ArcTanh}[c\,x]^2}{c\,x}-\frac{2}{3}\text{ArcTanh}[c\,x]^3-2\,\text{ArcTanh}[c\,x]\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]+\text{Log}\left[\frac{c\,x}{\sqrt{1-c^2\,x^2}}\right]+\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]+\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]-\frac{1}{2}\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)\right)$$

Problem 102: Result unnecessarily involves imaginary or complex numbers.

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

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

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

Result (type 4, 388 leaves):

$$\frac{1}{24\,d}\left(-\frac{8\,a^2}{x^3}+\frac{12\,a^2\,c}{x^2}-\frac{24\,a^2\,c^2}{x}-24\,a^2\,c^3\,\text{Log}[x]+24\,a^2\,c^3\,\text{Log}[1+c\,x]-\frac{1}{x^3}8\,a\,b\left(\text{ArcTanh}[c\,x]\left(2-3\,c\,x+6\,c^2\,x^2+3\,c^3\,x^3+6\,c^3\,x^3\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)-c\,x\left(-1+3\,c\,x+c^2\,x^2+8\,c^2\,x^2\,\text{Log}\left[\frac{c\,x}{\sqrt{1-c^2\,x^2}}\right]\right)-3\,c^3\,x^3\,\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]\right)+b^2\,c^3\left(-i\,\pi^3-\frac{8}{c\,x}+8\,\text{ArcTanh}[c\,x]-\frac{8\,\text{ArcTanh}[c\,x]}{c^2\,x^2}+\frac{24\,\text{ArcTanh}[c\,x]}{c\,x}+20\,\text{ArcTanh}[c\,x]^2-\frac{8\,\text{ArcTanh}[c\,x]^2}{c^3\,x^3}+\frac{12\,\text{ArcTanh}[c\,x]^2}{c^2\,x^2}-\frac{24\,\text{ArcTanh}[c\,x]^2}{c\,x}+16\,\text{ArcTanh}[c\,x]^3+64\,\text{ArcTanh}[c\,x]\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c\,x]}\right]-24\,\text{ArcTanh}[c\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c\,x]}\right]-24\,\text{Log}\left[\frac{c\,x}{\sqrt{1-c^2\,x^2}}\right]-32\,\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]-24\,\text{ArcTanh}[c\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c\,x]}\right]+12\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c\,x]}\right]\right)\right)$$

Problem 108: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 295 leaves, 19 steps):

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

Result (type 4, 254 leaves):

$$\frac{1}{24 d^2}\left(\frac{24 a^2}{1+c x}+24 a^2 \text{Log}[c x]-24 a^2 \text{Log}[1+c x]+12 a b \left(\text{Cosh}[2 \text{ArcTanh}[c x]]-2 \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x]}\right]+ 2 \text{ArcTanh}[c x] \left(\text{Cosh}[2 \text{ArcTanh}[c x]]+2 \text{Log}\left[1-e^{-2 \text{ArcTanh}[c x]}\right]-\text{Sinh}[2 \text{ArcTanh}[c x]]\right)-\text{Sinh}[2 \text{ArcTanh}[c x]]\right)+ b^2 \left(i \pi^3-16 \text{ArcTanh}[c x]^3+6 \text{Cosh}[2 \text{ArcTanh}[c x]]+12 \text{ArcTanh}[c x] \text{Cosh}[2 \text{ArcTanh}[c x]]+12 \text{ArcTanh}[c x]^2 \text{Cosh}[2 \text{ArcTanh}[c x]]+ 24 \text{ArcTanh}[c x]^2 \text{Log}\left[1-e^{2 \text{ArcTanh}[c x]}\right]+24 \text{ArcTanh}[c x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x]}\right]-12 \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x]}\right]- 6 \text{Sinh}[2 \text{ArcTanh}[c x]]-12 \text{ArcTanh}[c x] \text{Sinh}[2 \text{ArcTanh}[c x]]-12 \text{ArcTanh}[c x]^2 \text{Sinh}[2 \text{ArcTanh}[c x]]\right)\right)$$

Problem 109: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 371 leaves, 23 steps):

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

Result (type 4, 347 leaves):

$$\frac{1}{12 d^2}\left(-\frac{12 a^2}{x}-\frac{12 a^2 c}{1+c x}-24 a^2 c \operatorname{Log}[x]+24 a^2 c \operatorname{Log}[1+c x]+\right.$$
$$b^2 c\left(-i \pi^3+12 \operatorname{ArcTanh}[c x]^2-\frac{12 \operatorname{ArcTanh}[c x]^2}{c x}+16 \operatorname{ArcTanh}[c x]^3-3 \operatorname{Cosh}[2 \operatorname{ArcTanh}[c x]]-6 \operatorname{ArcTanh}[c x] \operatorname{Cosh}[2 \operatorname{ArcTanh}[c x]]-\right.$$
$$6 \operatorname{ArcTanh}[c x]^2 \operatorname{Cosh}[2 \operatorname{ArcTanh}[c x]]+24 \operatorname{ArcTanh}[c x] \operatorname{Log}\left[1-e^{-2 \operatorname{ArcTanh}[c x]}\right]-24 \operatorname{ArcTanh}[c x]^2 \operatorname{Log}\left[1-e^{2 \operatorname{ArcTanh}[c x]}\right]-$$
$$12 \operatorname{PolyLog}\left[2, e^{-2 \operatorname{ArcTanh}[c x]}\right]-24 \operatorname{ArcTanh}[c x] \operatorname{PolyLog}\left[2, e^{2 \operatorname{ArcTanh}[c x]}\right]+12 \operatorname{PolyLog}\left[3, e^{2 \operatorname{ArcTanh}[c x]}\right]+$$
$$\left.3 \operatorname{Sinh}[2 \operatorname{ArcTanh}[c x]]+6 \operatorname{ArcTanh}[c x] \operatorname{Sinh}[2 \operatorname{ArcTanh}[c x]]+6 \operatorname{ArcTanh}[c x]^2 \operatorname{Sinh}[2 \operatorname{ArcTanh}[c x]]\right)+$$
$$6 a b c\left(-\operatorname{Cosh}[2 \operatorname{ArcTanh}[c x]]+4 \operatorname{Log}\left[\frac{c x}{\sqrt{1-c^2 x^2}}\right]+4 \operatorname{PolyLog}\left[2, e^{-2 \operatorname{ArcTanh}[c x]}\right]+\operatorname{Sinh}[2 \operatorname{ArcTanh}[c x]]+\right.$$
$$\left.\left.\operatorname{ArcTanh}[c x]\left(-\frac{4}{c x}-2 \operatorname{Cosh}[2 \operatorname{ArcTanh}[c x]]-8 \operatorname{Log}\left[1-e^{-2 \operatorname{ArcTanh}[c x]}\right]+2 \operatorname{Sinh}[2 \operatorname{ArcTanh}[c x]]\right)\right)\right)$$

Problem 110: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 480 leaves, 31 steps):

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

Result (type 4, 452 leaves):

$$\frac{1}{8 d^2}\left(-\frac{4 a^2}{x^2}+\frac{16 a^2 c}{x}+\frac{8 a^2 c^2}{1+c x}+24 a^2 c^2 \text{Log}[x]-24 a^2 c^2 \text{Log}[1+c x]+\right.$$
$$b^2 c^2\left(i \pi^3-\frac{8 \text{ArcTanh}[c x]}{c x}-12 \text{ArcTanh}[c x]^2-\frac{4 \text{ArcTanh}[c x]^2}{c^2 x^2}+\frac{16 \text{ArcTanh}[c x]^2}{c x}-16 \text{ArcTanh}[c x]^3+2 \text{Cosh}[2 \text{ArcTanh}[c x]]+\right.$$
$$4 \text{ArcTanh}[c x] \text{Cosh}[2 \text{ArcTanh}[c x]]+4 \text{ArcTanh}[c x]^2 \text{Cosh}[2 \text{ArcTanh}[c x]]-32 \text{ArcTanh}[c x] \text{Log}\left[1-e^{-2 \text{ArcTanh}[c x]}\right]+$$
$$24 \text{ArcTanh}[c x]^2 \text{Log}\left[1-e^{2 \text{ArcTanh}[c x]}\right]+8 \text{Log}\left[\frac{c x}{\sqrt{1-c^2 x^2}}\right]+16 \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x]}\right]+24 \text{ArcTanh}[c x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x]}\right]-$$
$$\left.12 \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x]}\right]-2 \text{Sinh}[2 \text{ArcTanh}[c x]]-4 \text{ArcTanh}[c x] \text{Sinh}[2 \text{ArcTanh}[c x]]-4 \text{ArcTanh}[c x]^2 \text{Sinh}[2 \text{ArcTanh}[c x]]\right)+\frac{1}{x^2}$$
$$4 a b\left(-6 c^2 x^2 \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x]}\right]+c x\left(-2+c x \text{Cosh}[2 \text{ArcTanh}[c x]]-8 c x \text{Log}\left[\frac{c x}{\sqrt{1-c^2 x^2}}\right]-c x \text{Sinh}[2 \text{ArcTanh}[c x]]\right)+\right.$$
$$\left.\left.2 \text{ArcTanh}[c x]\left(-1+4 c x+c^2 x^2+c^2 x^2 \text{Cosh}[2 \text{ArcTanh}[c x]]+6 c^2 x^2 \text{Log}\left[1-e^{-2 \text{ArcTanh}[c x]}\right]-c^2 x^2 \text{Sinh}[2 \text{ArcTanh}[c x]]\right)\right)\right)$$

Problem 116: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 362 leaves, 32 steps):

$$\frac{b^2}{16 d^3 (1+c x)^2}+\frac{11 b^2}{16 d^3 (1+c x)}-\frac{11 b^2 \text{ArcTanh}[c x]}{16 d^3}+\frac{b (a+b \text{ArcTanh}[c x])}{4 d^3 (1+c x)^2}+\frac{5 b (a+b \text{ArcTanh}[c x])}{4 d^3 (1+c x)}-$$
$$\frac{5 (a+b \text{ArcTanh}[c x])^2}{8 d^3}+\frac{(a+b \text{ArcTanh}[c x])^2}{2 d^3 (1+c x)^2}+\frac{(a+b \text{ArcTanh}[c x])^2}{d^3 (1+c x)}+\frac{2 (a+b \text{ArcTanh}[c x])^2 \text{ArcTanh}\left[1-\frac{2}{1-c x}\right]}{d^3}+$$
$$\frac{(a+b \text{ArcTanh}[c x])^2 \text{Log}\left[\frac{2}{1+c x}\right]}{d^3}-\frac{b (a+b \text{ArcTanh}[c x]) \text{PolyLog}\left[2, 1-\frac{2}{1-c x}\right]}{d^3}+\frac{b (a+b \text{ArcTanh}[c x]) \text{PolyLog}\left[2, -1+\frac{2}{1-c x}\right]}{d^3}-$$
$$\frac{b (a+b \text{ArcTanh}[c x]) \text{PolyLog}\left[2, 1-\frac{2}{1+c x}\right]}{d^3}+\frac{b^2 \text{PolyLog}\left[3, 1-\frac{2}{1-c x}\right]}{2 d^3}-\frac{b^2 \text{PolyLog}\left[3, -1+\frac{2}{1-c x}\right]}{2 d^3}-\frac{b^2 \text{PolyLog}\left[3, 1-\frac{2}{1+c x}\right]}{2 d^3}$$

Result (type 4, 376 leaves):

$$\frac{1}{192 d^3}\left(\frac{96 a^2}{(1+c x)^2}+\frac{192 a^2}{1+c x}+192 a^2 \text{Log}[c x]-192 a^2 \text{Log}[1+c x]+\right.$$
$$12 a b \left(12 \text{Cosh}[2 \text{ArcTanh}[c x]]+\text{Cosh}[4 \text{ArcTanh}[c x]]-16 \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x]}\right]-12 \text{Sinh}[2 \text{ArcTanh}[c x]]+\right.$$
$$4 \text{ArcTanh}[c x] \left(6 \text{Cosh}[2 \text{ArcTanh}[c x]]+\text{Cosh}[4 \text{ArcTanh}[c x]]+8 \text{Log}\left[1-e^{-2 \text{ArcTanh}[c x]}\right]-6 \text{Sinh}[2 \text{ArcTanh}[c x]]-\text{Sinh}[4 \text{ArcTanh}[c x]]\right)-$$
$$\left.\text{Sinh}[4 \text{ArcTanh}[c x]]\right)+b^2 \left(8 i \pi^3-128 \text{ArcTanh}[c x]^3+72 \text{Cosh}[2 \text{ArcTanh}[c x]]+144 \text{ArcTanh}[c x] \text{Cosh}[2 \text{ArcTanh}[c x]]+\right.$$
$$144 \text{ArcTanh}[c x]^2 \text{Cosh}[2 \text{ArcTanh}[c x]]+3 \text{Cosh}[4 \text{ArcTanh}[c x]]+12 \text{ArcTanh}[c x] \text{Cosh}[4 \text{ArcTanh}[c x]]+$$
$$24 \text{ArcTanh}[c x]^2 \text{Cosh}[4 \text{ArcTanh}[c x]]+192 \text{ArcTanh}[c x]^2 \text{Log}\left[1-e^{2 \text{ArcTanh}[c x]}\right]+192 \text{ArcTanh}[c x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x]}\right]-$$
$$96 \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x]}\right]-72 \text{Sinh}[2 \text{ArcTanh}[c x]]-144 \text{ArcTanh}[c x] \text{Sinh}[2 \text{ArcTanh}[c x]]-144 \text{ArcTanh}[c x]^2 \text{Sinh}[2 \text{ArcTanh}[c x]]-$$
$$\left.\left.3 \text{Sinh}[4 \text{ArcTanh}[c x]]-12 \text{ArcTanh}[c x] \text{Sinh}[4 \text{ArcTanh}[c x]]-24 \text{ArcTanh}[c x]^2 \text{Sinh}[4 \text{ArcTanh}[c x]]\right)\right)$$

Problem 117: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 448 leaves, 36 steps):

$$-\frac{b^2 c}{16 d^3 (1+c x)^2}-\frac{19 b^2 c}{16 d^3 (1+c x)}+\frac{19 b^2 c \text{ArcTanh}[c x]}{16 d^3}-\frac{b c (a+b \text{ArcTanh}[c x])}{4 d^3 (1+c x)^2}-\frac{9 b c (a+b \text{ArcTanh}[c x])}{4 d^3 (1+c x)}+\frac{17 c (a+b \text{ArcTanh}[c x])^2}{8 d^3}-$$
$$\frac{(a+b \text{ArcTanh}[c x])^2}{d^3 x}-\frac{c (a+b \text{ArcTanh}[c x])^2}{2 d^3 (1+c x)^2}-\frac{2 c (a+b \text{ArcTanh}[c x])^2}{d^3 (1+c x)}-\frac{6 c (a+b \text{ArcTanh}[c x])^2 \text{ArcTanh}\left[1-\frac{2}{1-c x}\right]}{d^3}-$$
$$\frac{3 c (a+b \text{ArcTanh}[c x])^2 \text{Log}\left[\frac{2}{1+c x}\right]}{d^3}+\frac{2 b c (a+b \text{ArcTanh}[c x]) \text{Log}\left[2-\frac{2}{1+c x}\right]}{d^3}+\frac{3 b c (a+b \text{ArcTanh}[c x]) \text{PolyLog}\left[2, 1-\frac{2}{1-c x}\right]}{d^3}-$$
$$\frac{3 b c (a+b \text{ArcTanh}[c x]) \text{PolyLog}\left[2, -1+\frac{2}{1-c x}\right]}{d^3}+\frac{3 b c (a+b \text{ArcTanh}[c x]) \text{PolyLog}\left[2, 1-\frac{2}{1+c x}\right]}{d^3}-$$
$$\frac{b^2 c \text{PolyLog}\left[2, -1+\frac{2}{1+c x}\right]}{d^3}-\frac{3 b^2 c \text{PolyLog}\left[3, 1-\frac{2}{1-c x}\right]}{2 d^3}+\frac{3 b^2 c \text{PolyLog}\left[3, -1+\frac{2}{1-c x}\right]}{2 d^3}+\frac{3 b^2 c \text{PolyLog}\left[3, 1-\frac{2}{1+c x}\right]}{2 d^3}$$

Result (type 4, 479 leaves):

$$\frac{1}{64 d^3}\left(-\frac{64 a^2}{x}-\frac{32 a^2 c}{(1+c x)^2}-\frac{128 a^2 c}{1+c x}-192 a^2 c \text{Log}[x]+192 a^2 c \text{Log}[1+c x]+b^2 c\left(-8 i \pi^3+64 \text{ArcTanh}[c x]^2-\frac{64 \text{ArcTanh}[c x]^2}{c x}+128 \text{ArcTanh}[c x]^3-\right.\right.$$
$$40 \text{Cosh}[2 \text{ArcTanh}[c x]]-80 \text{ArcTanh}[c x] \text{Cosh}[2 \text{ArcTanh}[c x]]-80 \text{ArcTanh}[c x]^2 \text{Cosh}[2 \text{ArcTanh}[c x]]-\text{Cosh}[4 \text{ArcTanh}[c x]]-$$
$$4 \text{ArcTanh}[c x] \text{Cosh}[4 \text{ArcTanh}[c x]]-8 \text{ArcTanh}[c x]^2 \text{Cosh}[4 \text{ArcTanh}[c x]]+128 \text{ArcTanh}[c x] \text{Log}\left[1-e^{-2 \text{ArcTanh}[c x]}\right]-$$
$$192 \text{ArcTanh}[c x]^2 \text{Log}\left[1-e^{2 \text{ArcTanh}[c x]}\right]-64 \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x]}\right]-192 \text{ArcTanh}[c x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c x]}\right]+$$
$$96 \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c x]}\right]+40 \text{Sinh}[2 \text{ArcTanh}[c x]]+80 \text{ArcTanh}[c x] \text{Sinh}[2 \text{ArcTanh}[c x]]+80 \text{ArcTanh}[c x]^2 \text{Sinh}[2 \text{ArcTanh}[c x]]+$$
$$\left.\text{Sinh}[4 \text{ArcTanh}[c x]]+4 \text{ArcTanh}[c x] \text{Sinh}[4 \text{ArcTanh}[c x]]+8 \text{ArcTanh}[c x]^2 \text{Sinh}[4 \text{ArcTanh}[c x]]\right)+$$
$$\frac{1}{x} 4 a b\left(48 c x \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c x]}\right]+c x\left(-20 \text{Cosh}[2 \text{ArcTanh}[c x]]-\text{Cosh}[4 \text{ArcTanh}[c x]]+32 \text{Log}\left[\frac{c x}{\sqrt{1-c^2 x^2}}\right]+\right.\right.$$
$$\left.20 \text{Sinh}[2 \text{ArcTanh}[c x]]+\text{Sinh}[4 \text{ArcTanh}[c x]]\right)-4 \text{ArcTanh}[c x]\left(8+10 c x \text{Cosh}[2 \text{ArcTanh}[c x]]+\right.$$
$$\left.\left.\left.c x \text{Cosh}[4 \text{ArcTanh}[c x]]+24 c x \text{Log}\left[1-e^{-2 \text{ArcTanh}[c x]}\right]-10 c x \text{Sinh}[2 \text{ArcTanh}[c x]]-c x \text{Sinh}[4 \text{ArcTanh}[c x]]\right)\right)\right)$$

Problem 120: Result more than twice size of optimal antiderivative.

$$\int (1+c x)^3 (a+b \text{ArcTanh}[c x])^3 \, dx$$

Optimal (type 4, 306 leaves, 26 steps):

$$3 a b^2 x+\frac{b^3 x}{4}-\frac{b^3 \text{ArcTanh}[c x]}{4 c}+3 b^3 x \text{ArcTanh}[c x]+\frac{1}{4} b^2 c x^2 (a+b \text{ArcTanh}[c x])+$$
$$\frac{4 b (a+b \text{ArcTanh}[c x])^2}{c}+\frac{21}{4} b x (a+b \text{ArcTanh}[c x])^2+\frac{3}{2} b c x^2 (a+b \text{ArcTanh}[c x])^2+\frac{1}{4} b c^2 x^3 (a+b \text{ArcTanh}[c x])^2+$$
$$\frac{(1+c x)^4 (a+b \text{ArcTanh}[c x])^3}{4 c}-\frac{11 b^2 (a+b \text{ArcTanh}[c x]) \text{Log}\left[\frac{2}{1-c x}\right]}{c}-\frac{6 b (a+b \text{ArcTanh}[c x])^2 \text{Log}\left[\frac{2}{1-c x}\right]}{c}+$$
$$\frac{3 b^3 \text{Log}\left[1-c^2 x^2\right]}{2 c}-\frac{11 b^3 \text{PolyLog}\left[2,1-\frac{2}{1-c x}\right]}{2 c}-\frac{6 b^2 (a+b \text{ArcTanh}[c x]) \text{PolyLog}\left[2,1-\frac{2}{1-c x}\right]}{c}+\frac{3 b^3 \text{PolyLog}\left[3,1-\frac{2}{1-c x}\right]}{c}$$

Result (type 4, 644 leaves):

$$\begin{aligned}\frac{1}{8c}\Big(&-2ab^2+8a^3cx+42a^2bcx+24ab^2cx+2b^3cx+12a^3c^2x^2+12a^2bc^2x^2+2ab^2c^2x^2+8a^3c^3x^3+2a^2bc^3x^3+2a^3c^4x^4-24ab^2\text{ArcTanh}[cx]-\\&2b^3\text{ArcTanh}[cx]+24a^2bcx\,\text{ArcTanh}[cx]+84ab^2cx\,\text{ArcTanh}[cx]+24b^3cx\,\text{ArcTanh}[cx]+36a^2bc^2x^2\,\text{ArcTanh}[cx]+\\&24ab^2c^2x^2\,\text{ArcTanh}[cx]+2b^3c^2x^2\,\text{ArcTanh}[cx]+24a^2bc^3x^3\,\text{ArcTanh}[cx]+4ab^2c^3x^3\,\text{ArcTanh}[cx]+6a^2bc^4x^4\,\text{ArcTanh}[cx]-\\&90ab^2\text{ArcTanh}[cx]^2-56b^3\text{ArcTanh}[cx]^2+24ab^2cx\,\text{ArcTanh}[cx]^2+42b^3cx\,\text{ArcTanh}[cx]^2+36ab^2c^2x^2\,\text{ArcTanh}[cx]^2+\\&12b^3c^2x^2\,\text{ArcTanh}[cx]^2+24ab^2c^3x^3\,\text{ArcTanh}[cx]^2+2b^3c^3x^3\,\text{ArcTanh}[cx]^2+6ab^2c^4x^4\,\text{ArcTanh}[cx]^2-30b^3\text{ArcTanh}[cx]^3+\\&8b^3cx\,\text{ArcTanh}[cx]^3+12b^3c^2x^2\,\text{ArcTanh}[cx]^3+8b^3c^3x^3\,\text{ArcTanh}[cx]^3+2b^3c^4x^4\,\text{ArcTanh}[cx]^3-96ab^2\text{ArcTanh}[cx]\,\text{Log}\left[1+e^{-2\text{ArcTanh}[cx]}\right]-\\&88b^3\text{ArcTanh}[cx]\,\text{Log}\left[1+e^{-2\text{ArcTanh}[cx]}\right]-48b^3\text{ArcTanh}[cx]^2\,\text{Log}\left[1+e^{-2\text{ArcTanh}[cx]}\right]+45a^2b\,\text{Log}[1-cx]+3a^2b\,\text{Log}[1+cx]+\\&44ab^2\text{Log}\left[1-c^2x^2\right]+12b^3\text{Log}\left[1-c^2x^2\right]+4b^2\left(12a+11b+12b\,\text{ArcTanh}[cx]\right)\text{PolyLog}\left[2,-e^{-2\text{ArcTanh}[cx]}\right]+24b^3\text{PolyLog}\left[3,-e^{-2\text{ArcTanh}[cx]}\right]\Big)\end{aligned}$$

Problem 121: Result more than twice size of optimal antiderivative.

$$\int(1+cx)^2\,(a+b\,\text{ArcTanh}[cx])^3\,dx$$

Optimal (type 4, 240 leaves, 17 steps):

$$\begin{aligned}&ab^2x+b^3x\,\text{ArcTanh}[cx]+\frac{5b\,(a+b\,\text{ArcTanh}[cx])^2}{2c}+3bx\,(a+b\,\text{ArcTanh}[cx])^2+\frac{1}{2}bcx^2\,(a+b\,\text{ArcTanh}[cx])^2+\\&\frac{(1+cx)^3\,(a+b\,\text{ArcTanh}[cx])^3}{3c}-\frac{6b^2\,(a+b\,\text{ArcTanh}[cx])\,\text{Log}\left[\frac{2}{1-cx}\right]}{c}-\frac{4b\,(a+b\,\text{ArcTanh}[cx])^2\,\text{Log}\left[\frac{2}{1-cx}\right]}{c}+\\&\frac{b^3\,\text{Log}\left[1-c^2x^2\right]}{2c}-\frac{3b^3\,\text{PolyLog}\left[2,1-\frac{2}{1-cx}\right]}{c}-\frac{4b^2\,(a+b\,\text{ArcTanh}[cx])\,\text{PolyLog}\left[2,1-\frac{2}{1-cx}\right]}{c}+\frac{2b^3\,\text{PolyLog}\left[3,1-\frac{2}{1-cx}\right]}{c}\end{aligned}$$

Result (type 4, 488 leaves):

$$\begin{aligned}\frac{1}{6c}\Big(&6a^3cx+18a^2bcx+6ab^2cx+6a^3c^2x^2+3a^2bc^2x^2+2a^3c^3x^3-6ab^2\text{ArcTanh}[cx]+18a^2bcx\,\text{ArcTanh}[cx]+\\&36ab^2cx\,\text{ArcTanh}[cx]+6b^3cx\,\text{ArcTanh}[cx]+18a^2bc^2x^2\,\text{ArcTanh}[cx]+6ab^2c^2x^2\,\text{ArcTanh}[cx]+6a^2bc^3x^3\,\text{ArcTanh}[cx]-\\&42ab^2\text{ArcTanh}[cx]^2-21b^3\text{ArcTanh}[cx]^2+18ab^2cx\,\text{ArcTanh}[cx]^2+18b^3cx\,\text{ArcTanh}[cx]^2+18ab^2c^2x^2\,\text{ArcTanh}[cx]^2+\\&3b^3c^2x^2\,\text{ArcTanh}[cx]^2+6ab^2c^3x^3\,\text{ArcTanh}[cx]^2-14b^3\text{ArcTanh}[cx]^3+6b^3cx\,\text{ArcTanh}[cx]^3+6b^3c^2x^2\,\text{ArcTanh}[cx]^3+\\&2b^3c^3x^3\,\text{ArcTanh}[cx]^3-48ab^2\text{ArcTanh}[cx]\,\text{Log}\left[1+e^{-2\text{ArcTanh}[cx]}\right]-36b^3\text{ArcTanh}[cx]\,\text{Log}\left[1+e^{-2\text{ArcTanh}[cx]}\right]-\\&24b^3\text{ArcTanh}[cx]^2\,\text{Log}\left[1+e^{-2\text{ArcTanh}[cx]}\right]+21a^2b\,\text{Log}[1-cx]+3a^2b\,\text{Log}[1+cx]+18ab^2\text{Log}\left[1-c^2x^2\right]+\\&3b^3\text{Log}\left[1-c^2x^2\right]+6b^2\left(4a+3b+4b\,\text{ArcTanh}[cx]\right)\text{PolyLog}\left[2,-e^{-2\text{ArcTanh}[cx]}\right]+12b^3\text{PolyLog}\left[3,-e^{-2\text{ArcTanh}[cx]}\right]\Big)\end{aligned}$$

Problem 132: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}[ax]^3}{x^2\,(c+acx)}\,dx$$

Optimal (type 4, 191 leaves, 10 steps):

$$\frac{a\,\text{ArcTanh}[a\,x]^3}{c}-\frac{\text{ArcTanh}[a\,x]^3}{c\,x}+\frac{3\,a\,\text{ArcTanh}[a\,x]^2\,\text{Log}\left[2-\frac{2}{1+a\,x}\right]}{c}-\frac{a\,\text{ArcTanh}[a\,x]^3\,\text{Log}\left[2-\frac{2}{1+a\,x}\right]}{c}-\frac{3\,a\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[2,-1+\frac{2}{1+a\,x}\right]}{c}+\frac{3\,a\,\text{ArcTanh}[a\,x]^2\,\text{PolyLog}\left[2,-1+\frac{2}{1+a\,x}\right]}{2\,c}-\frac{3\,a\,\text{PolyLog}\left[3,-1+\frac{2}{1+a\,x}\right]}{2\,c}+\frac{3\,a\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[3,-1+\frac{2}{1+a\,x}\right]}{2\,c}+\frac{3\,a\,\text{PolyLog}\left[4,-1+\frac{2}{1+a\,x}\right]}{4\,c}$$

Result (type 4, 154 leaves):

$$\frac{1}{c}a\left(\frac{i\,\pi^3}{8}-\frac{\pi^4}{64}-\text{ArcTanh}[a\,x]^3-\frac{\text{ArcTanh}[a\,x]^3}{a\,x}+\frac{1}{2}\text{ArcTanh}[a\,x]^4+3\,\text{ArcTanh}[a\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a\,x]}\right]-\text{ArcTanh}[a\,x]^3\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a\,x]}\right]-\frac{3}{2}\left(-2+\text{ArcTanh}[a\,x]\right)\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[a\,x]}\right]+\frac{3}{2}\left(-1+\text{ArcTanh}[a\,x]\right)\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[a\,x]}\right]-\frac{3}{4}\text{PolyLog}\left[4,e^{2\,\text{ArcTanh}[a\,x]}\right]\right)$$

Problem 133: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}[a\,x]^3}{x^3\,(c+a\,c\,x)}\,dx$$

Optimal (type 4, 305 leaves, 18 steps):

$$\frac{3\,a^2\,\text{ArcTanh}[a\,x]^2}{2\,c}-\frac{3\,a\,\text{ArcTanh}[a\,x]^2}{2\,c\,x}-\frac{a^2\,\text{ArcTanh}[a\,x]^3}{2\,c}-\frac{\text{ArcTanh}[a\,x]^3}{2\,c\,x^2}+\frac{a\,\text{ArcTanh}[a\,x]^3}{c\,x}+\frac{3\,a^2\,\text{ArcTanh}[a\,x]\,\text{Log}\left[2-\frac{2}{1+a\,x}\right]}{c}-\frac{3\,a^2\,\text{ArcTanh}[a\,x]^2\,\text{Log}\left[2-\frac{2}{1+a\,x}\right]}{c}+\frac{a^2\,\text{ArcTanh}[a\,x]^3\,\text{Log}\left[2-\frac{2}{1+a\,x}\right]}{c}-\frac{3\,a^2\,\text{PolyLog}\left[2,-1+\frac{2}{1+a\,x}\right]}{2\,c}+\frac{3\,a^2\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[2,-1+\frac{2}{1+a\,x}\right]}{c}-\frac{3\,a^2\,\text{ArcTanh}[a\,x]^2\,\text{PolyLog}\left[2,-1+\frac{2}{1+a\,x}\right]}{2\,c}+\frac{3\,a^2\,\text{PolyLog}\left[3,-1+\frac{2}{1+a\,x}\right]}{2\,c}-\frac{3\,a^2\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[3,-1+\frac{2}{1+a\,x}\right]}{2\,c}-\frac{3\,a^2\,\text{PolyLog}\left[4,-1+\frac{2}{1+a\,x}\right]}{4\,c}$$

Result (type 4, 222 leaves):

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

Problem 139: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}[a\,x]^4}{x^2\,(c-a\,c\,x)}\,dx$$

Optimal (type 4, 239 leaves, 12 steps):

$$\frac{a\,\text{ArcTanh}[a x]^4}{c}-\frac{\text{ArcTanh}[a x]^4}{c x}+\frac{a\,\text{ArcTanh}[a x]^4\,\text{Log}\left[2-\frac{2}{1-a x}\right]}{c}+\frac{4 a\,\text{ArcTanh}[a x]^3\,\text{Log}\left[2-\frac{2}{1+a x}\right]}{c}+\frac{2 a\,\text{ArcTanh}[a x]^3\,\text{PolyLog}\left[2,-1+\frac{2}{1-a x}\right]}{c}-\frac{6 a\,\text{ArcTanh}[a x]^2\,\text{PolyLog}\left[2,-1+\frac{2}{1+a x}\right]}{c}-\frac{3 a\,\text{ArcTanh}[a x]^2\,\text{PolyLog}\left[3,-1+\frac{2}{1-a x}\right]}{c}-\frac{6 a\,\text{ArcTanh}[a x]\,\text{PolyLog}\left[3,-1+\frac{2}{1+a x}\right]}{c}+\frac{3 a\,\text{ArcTanh}[a x]\,\text{PolyLog}\left[4,-1+\frac{2}{1-a x}\right]}{c}-\frac{3 a\,\text{PolyLog}\left[4,-1+\frac{2}{1+a x}\right]}{c}-\frac{3 a\,\text{PolyLog}\left[5,-1+\frac{2}{1-a x}\right]}{2 c}$$

Result (type 4, 172 leaves):

$$-\frac{1}{c}a\left(-\frac{\pi^4}{16}+\frac{i\pi^5}{160}+\text{ArcTanh}[a x]^4+\frac{\text{ArcTanh}[a x]^4}{a x}-4\,\text{ArcTanh}[a x]^3\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a x]}\right]-\text{ArcTanh}[a x]^4\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a x]}\right]-2\,\text{ArcTanh}[a x]^2\left(3+\text{ArcTanh}[a x]\right)\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[a x]}\right]+3\,\text{ArcTanh}[a x]\left(2+\text{ArcTanh}[a x]\right)\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[a x]}\right]-3\,\text{PolyLog}\left[4,e^{2\,\text{ArcTanh}[a x]}\right]-3\,\text{ArcTanh}[a x]\,\text{PolyLog}\left[4,e^{2\,\text{ArcTanh}[a x]}\right]+\frac{3}{2}\text{PolyLog}\left[5,e^{2\,\text{ArcTanh}[a x]}\right]\right)$$

Problem 140: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}[a x]^4}{x^3\,(c-a c x)}\,dx$$

Optimal (type 4, 380 leaves, 21 steps):

$$\frac{2 a^2\,\text{ArcTanh}[a x]^3}{c}-\frac{2 a\,\text{ArcTanh}[a x]^3}{c x}+\frac{3 a^2\,\text{ArcTanh}[a x]^4}{2 c}-\frac{\text{ArcTanh}[a x]^4}{2 c x^2}-\frac{a\,\text{ArcTanh}[a x]^4}{c x}+\frac{a^2\,\text{ArcTanh}[a x]^4\,\text{Log}\left[2-\frac{2}{1-a x}\right]}{c}+\frac{6 a^2\,\text{ArcTanh}[a x]^2\,\text{Log}\left[2-\frac{2}{1+a x}\right]}{c}+\frac{4 a^2\,\text{ArcTanh}[a x]^3\,\text{Log}\left[2-\frac{2}{1+a x}\right]}{c}+\frac{2 a^2\,\text{ArcTanh}[a x]^3\,\text{PolyLog}\left[2,-1+\frac{2}{1-a x}\right]}{c}-\frac{6 a^2\,\text{ArcTanh}[a x]\,\text{PolyLog}\left[2,-1+\frac{2}{1+a x}\right]}{c}-\frac{6 a^2\,\text{ArcTanh}[a x]^2\,\text{PolyLog}\left[2,-1+\frac{2}{1+a x}\right]}{c}-\frac{3 a^2\,\text{ArcTanh}[a x]^2\,\text{PolyLog}\left[3,-1+\frac{2}{1-a x}\right]}{c}-\frac{3 a^2\,\text{PolyLog}\left[3,-1+\frac{2}{1+a x}\right]}{c}-\frac{6 a^2\,\text{ArcTanh}[a x]\,\text{PolyLog}\left[3,-1+\frac{2}{1+a x}\right]}{c}+\frac{3 a^2\,\text{ArcTanh}[a x]\,\text{PolyLog}\left[4,-1+\frac{2}{1-a x}\right]}{c}-\frac{3 a^2\,\text{PolyLog}\left[4,-1+\frac{2}{1+a x}\right]}{c}-\frac{3 a^2\,\text{PolyLog}\left[5,-1+\frac{2}{1-a x}\right]}{2 c}$$

Result (type 4, 250 leaves):

$$-\frac{1}{c}a^2\left(-\frac{i\pi^3}{4}-\frac{\pi^4}{16}+\frac{i\pi^5}{160}+2\,\text{ArcTanh}[a\,x]^3+\frac{2\,\text{ArcTanh}[a\,x]^3}{a\,x}+\frac{1}{2}\text{ArcTanh}[a\,x]^4+\frac{\text{ArcTanh}[a\,x]^4}{2\,a^2\,x^2}+\frac{\text{ArcTanh}[a\,x]^4}{a\,x}-\right.$$
$$6\,\text{ArcTanh}[a\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a\,x]}\right]-4\,\text{ArcTanh}[a\,x]^3\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a\,x]}\right]-\text{ArcTanh}[a\,x]^4\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a\,x]}\right]-$$
$$2\,\text{ArcTanh}[a\,x]\left(3+3\,\text{ArcTanh}[a\,x]+\text{ArcTanh}[a\,x]^2\right)\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[a\,x]}\right]+3\left(1+\text{ArcTanh}[a\,x]\right)^2\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[a\,x]}\right]-$$
$$\left.3\,\text{PolyLog}\left[4,e^{2\,\text{ArcTanh}[a\,x]}\right]-3\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[4,e^{2\,\text{ArcTanh}[a\,x]}\right]+\frac{3}{2}\text{PolyLog}\left[5,e^{2\,\text{ArcTanh}[a\,x]}\right]\right)$$

Problem 147: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 275 leaves, 16 steps):

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

Result (type 4, 474 leaves):

$$\frac{1}{12 e^4}\left(-\frac{2 b e^3}{c^3}+12 a d^2 e x-\frac{6 b d e^2 x}{c}-6 a d e^2 x^2+\frac{2 b e^3 x^2}{c}+4 a e^3 x^3+\frac{6 b d e^2 \text{ArcTanh}[c x]}{c^2}-6 i b d^3 \pi \text{ArcTanh}[c x]+12 b d^2 e x \text{ArcTanh}[c x]-\right.$$

$$6 b d e^2 x^2 \text{ArcTanh}[c x]+4 b e^3 x^3 \text{ArcTanh}[c x]-12 b d^3 \text{ArcTanh}\left[\frac{c d}{e}\right] \text{ArcTanh}[c x]+6 b d^3 \text{ArcTanh}[c x]^2-\frac{6 b d^2 e \text{ArcTanh}[c x]^2}{c}+$$

$$\frac{6 b d^2 \sqrt{1-\frac{c^2 d^2}{e^2}}\, e\, e^{-\text{ArcTanh}\left[\frac{c d}{e}\right]} \text{ArcTanh}[c x]^2}{c}+12 b d^3 \text{ArcTanh}[c x] \text{Log}\left[1+e^{-2 \text{ArcTanh}[c x]}\right]+6 i b d^3 \pi \text{Log}\left[1+e^{2 \text{ArcTanh}[c x]}\right]-$$

$$12 b d^3 \text{ArcTanh}\left[\frac{c d}{e}\right] \text{Log}\left[1-e^{-2\left(\text{ArcTanh}\left[\frac{c d}{e}\right]+\text{ArcTanh}[c x]\right)}\right]-12 b d^3 \text{ArcTanh}[c x] \text{Log}\left[1-e^{-2\left(\text{ArcTanh}\left[\frac{c d}{e}\right]+\text{ArcTanh}[c x]\right)}\right]-12 a d^3 \text{Log}[d+e x]+$$

$$\frac{6 b d^2 e \text{Log}\left[1-c^2 x^2\right]}{c}+\frac{2 b e^3 \text{Log}\left[1-c^2 x^2\right]}{c^3}+3 i b d^3 \pi \text{Log}\left[1-c^2 x^2\right]+12 b d^3 \text{ArcTanh}\left[\frac{c d}{e}\right] \text{Log}\left[i \text{Sinh}\left[\text{ArcTanh}\left[\frac{c d}{e}\right]+\text{ArcTanh}[c x]\right]\right]-$$

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

Problem 148: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 214 leaves, 12 steps):

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

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

Result (type 4, 394 leaves):

$$\frac{1}{2 e^3}\left(-2 a d e x+\frac{b e^2 x}{c}+a e^2 x^2-\frac{b e^2 \operatorname{ArcTanh}[c x]}{c^2}+i b d^2 \pi \operatorname{ArcTanh}[c x]-2 b d e x \operatorname{ArcTanh}[c x]+b e^2 x^2 \operatorname{ArcTanh}[c x]+\right.$$

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

$$2 b d^2 \operatorname{ArcTanh}[c x] \operatorname{Log}\left[1+e^{-2 \operatorname{ArcTanh}[c x]}\right]-i b d^2 \pi \operatorname{Log}\left[1+e^{2 \operatorname{ArcTanh}[c x]}\right]+2 b d^2 \operatorname{ArcTanh}\left[\frac{c d}{e}\right] \operatorname{Log}\left[1-e^{-2\left(\operatorname{ArcTanh}\left[\frac{c d}{e}\right]+\operatorname{ArcTanh}[c x]\right)}\right]+$$

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

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

Problem 149: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 156 leaves, 9 steps):

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

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

Result (type 4, 315 leaves):

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

Problem 150: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 4, 257 leaves):

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

Problem 151: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 148 leaves, 7 steps):

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

Result (type 4, 294 leaves):

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

Problem 152: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 200 leaves, 12 steps):

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

Result (type 4, 360 leaves):

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

Problem 153: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 261 leaves, 15 steps):

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

Result (type 4, 435 leaves):

$$\frac{1}{4 d^4}\left(-\frac{2 a d^3}{x^2}-\frac{2 b c d^3}{x}+\frac{4 a d^2 e}{x}+2 b c^2 d^3 \text{ArcTanh}[c x]-2 i b d e^2 \pi \text{ArcTanh}[c x]-\frac{2 b d^3 \text{ArcTanh}[c x]}{x^2}+\right.$$

$$\frac{4 b d^2 e \text{ArcTanh}[c x]}{x}-4 b d e^2 \text{ArcTanh}\left[\frac{c d}{e}\right] \text{ArcTanh}[c x]+2 b d e^2 \text{ArcTanh}[c x]^2-\frac{2 b e^3 \text{ArcTanh}[c x]^2}{c}+$$

$$\frac{2 b \sqrt{1-\frac{c^2 d^2}{e^2}}\, e^3\, e^{-\text{ArcTanh}\left[\frac{c d}{e}\right]} \text{ArcTanh}[c x]^2}{c}+4 b d e^2 \text{ArcTanh}[c x] \text{Log}\left[1-e^{-2 \text{ArcTanh}[c x]}\right]+2 i b d e^2 \pi \text{Log}\left[1+e^{2 \text{ArcTanh}[c x]}\right]-$$

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

$$4 a d e^2 \text{Log}[d+e x]-4 b c d^2 e \text{Log}\left[\frac{c x}{\sqrt{1-c^2 x^2}}\right]+i b d e^2 \pi \text{Log}\left[1-c^2 x^2\right]+4 b d e^2 \text{ArcTanh}\left[\frac{c d}{e}\right] \text{Log}\left[i \text{Sinh}\left[\text{ArcTanh}\left[\frac{c d}{e}\right]+\text{ArcTanh}[c x]\right]\right]-$$

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

Problem 154: Unable to integrate problem.

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

Optimal (type 4, 385 leaves, 14 steps):

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

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

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

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

Result (type 8, 23 leaves):

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

Problem 155: Unable to integrate problem.

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

Optimal (type 4, 279 leaves, 8 steps):

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

Result (type 8, 21 leaves):

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

Problem 156: Unable to integrate problem.

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

Optimal (type 4, 188 leaves, 1 step):

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

Result (type 8, 20 leaves):

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

Problem 157: Unable to integrate problem.

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

Optimal (type 4, 319 leaves, 9 steps):

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

Result (type 8, 23 leaves):

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

Problem 158: Unable to integrate problem.

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

Optimal (type 4, 412 leaves, 13 steps):

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

Result (type 8, 23 leaves):

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

Problem 159: Unable to integrate problem.

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

Optimal (type 4, 275 leaves, 9 steps):

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

Result (type 8, 19 leaves):

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

Problem 212: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(1-a^2 x^2\right)^2 \text{ArcTanh}[a x]^2}{x^5} \, dx$$

Optimal (type 4, 214 leaves, 29 steps):

$$-\frac{a^2}{12 x^2}-\frac{a \text{ArcTanh}[a x]}{6 x^3}+\frac{3 a^3 \text{ArcTanh}[a x]}{2 x}-\frac{3}{4} a^4 \text{ArcTanh}[a x]^2-\frac{\text{ArcTanh}[a x]^2}{4 x^4}+\frac{a^2 \text{ArcTanh}[a x]^2}{x^2}+ 2 a^4 \text{ArcTanh}[a x]^2 \text{ArcTanh}\left[1-\frac{2}{1-a x}\right]-\frac{4}{3} a^4 \text{Log}[x]+\frac{2}{3} a^4 \text{Log}\left[1-a^2 x^2\right]-a^4 \text{ArcTanh}[a x] \text{PolyLog}\left[2,1-\frac{2}{1-a x}\right]+ a^4 \text{ArcTanh}[a x] \text{PolyLog}\left[2,-1+\frac{2}{1-a x}\right]+\frac{1}{2} a^4 \text{PolyLog}\left[3,1-\frac{2}{1-a x}\right]-\frac{1}{2} a^4 \text{PolyLog}\left[3,-1+\frac{2}{1-a x}\right]$$

Result (type 4, 238 leaves):

$$\frac{1}{24}\left(2 a^4+i a^4 \pi^3-\frac{2 a^2}{x^2}-\frac{4 a \text{ArcTanh}[a x]}{x^3}+\frac{36 a^3 \text{ArcTanh}[a x]}{x}-18 a^4 \text{ArcTanh}[a x]^2- \frac{6 \text{ArcTanh}[a x]^2}{x^4}+\frac{24 a^2 \text{ArcTanh}[a x]^2}{x^2}-16 a^4 \text{ArcTanh}[a x]^3-24 a^4 \text{ArcTanh}[a x]^2 \text{Log}\left[1+e^{-2 \text{ArcTanh}[a x]}\right]+ 24 a^4 \text{ArcTanh}[a x]^2 \text{Log}\left[1-e^{2 \text{ArcTanh}[a x]}\right]-32 a^4 \text{Log}\left[\frac{a x}{\sqrt{1-a^2 x^2}}\right]+24 a^4 \text{ArcTanh}[a x] \text{PolyLog}\left[2,-e^{-2 \text{ArcTanh}[a x]}\right]+ 24 a^4 \text{ArcTanh}[a x] \text{PolyLog}\left[2,e^{2 \text{ArcTanh}[a x]}\right]+12 a^4 \text{PolyLog}\left[3,-e^{-2 \text{ArcTanh}[a x]}\right]-12 a^4 \text{PolyLog}\left[3,e^{2 \text{ArcTanh}[a x]}\right]\right)$$

Problem 240: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}[a x]^2}{x^3 \left(1-a^2 x^2\right)} \, dx$$

Optimal (type 4, 138 leaves, 13 steps):

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

Result (type 4, 133 leaves):

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

Problem 246: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}[a x]^3}{x^2\left(1-a^2 x^2\right)}\,dx$$

Optimal (type 4, 90 leaves, 7 steps):

$$a\,\text{ArcTanh}[a x]^3-\frac{\text{ArcTanh}[a x]^3}{x}+\frac{1}{4}a\,\text{ArcTanh}[a x]^4+3 a\,\text{ArcTanh}[a x]^2\,\text{Log}\left[2-\frac{2}{1+a x}\right]-3 a\,\text{ArcTanh}[a x]\,\text{PolyLog}\left[2,-1+\frac{2}{1+a x}\right]-\frac{3}{2}a\,\text{PolyLog}\left[3,-1+\frac{2}{1+a x}\right]$$

Result (type 4, 93 leaves):

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

Problem 270: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}[a x]^2}{x\left(1-a^2 x^2\right)^2}\,dx$$

Optimal (type 4, 136 leaves, 8 steps):

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

Result (type 4, 106 leaves):

$$\frac{1}{24}\left(i\pi^3-8\,\text{ArcTanh}[a x]^3+3\,\text{Cosh}[2\,\text{ArcTanh}[a x]]+6\,\text{ArcTanh}[a x]^2\,\text{Cosh}[2\,\text{ArcTanh}[a x]]+24\,\text{ArcTanh}[a x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a x]}\right]+24\,\text{ArcTanh}[a x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[a x]}\right]-12\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[a x]}\right]-6\,\text{ArcTanh}[a x]\,\text{Sinh}[2\,\text{ArcTanh}[a x]]\right)$$

Problem 272: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}[a x]^2}{x^3 \left(1-a^2 x^2\right)^2} \, dx$$

Optimal (type 4, 205 leaves, 22 steps):

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

Result (type 4, 146 leaves):

$$a^2 \left(2 \text{ArcTanh}[a x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[a x]}\right]+\frac{1}{24} \left(2 i \pi^3-16 \text{ArcTanh}[a x]^3+3 \text{Cosh}[2 \text{ArcTanh}[a x]]+6 \text{ArcTanh}[a x]^2 \left(2-\frac{2}{a^2 x^2}+\text{Cosh}[2 \text{ArcTanh}[a x]]+8 \text{Log}\left[1-e^{2 \text{ArcTanh}[a x]}\right]\right)+24 \text{Log}\left[\frac{a x}{\sqrt{1-a^2 x^2}}\right]-24 \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[a x]}\right]-\frac{6 \text{ArcTanh}[a x] \left(4+a x \text{Sinh}[2 \text{ArcTanh}[a x]]\right)}{a x}\right)\right)$$

Problem 278: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}[a x]^3}{x^2 \left(1-a^2 x^2\right)^2} \, dx$$

Optimal (type 4, 191 leaves, 12 steps):

$$-\frac{3 a}{8 \left(1-a^2 x^2\right)}+\frac{3 a^2 x \text{ArcTanh}[a x]}{4 \left(1-a^2 x^2\right)}+\frac{3}{8} a \text{ArcTanh}[a x]^2-\frac{3 a \text{ArcTanh}[a x]^2}{4 \left(1-a^2 x^2\right)}+a \text{ArcTanh}[a x]^3-\frac{\text{ArcTanh}[a x]^3}{x}+\frac{a^2 x \text{ArcTanh}[a x]^3}{2 \left(1-a^2 x^2\right)}+\frac{3}{8} a \text{ArcTanh}[a x]^4+3 a \text{ArcTanh}[a x]^2 \text{Log}\left[2-\frac{2}{1+a x}\right]-3 a \text{ArcTanh}[a x] \text{PolyLog}\left[2,-1+\frac{2}{1+a x}\right]-\frac{3}{2} a \text{PolyLog}\left[3,-1+\frac{2}{1+a x}\right]$$

Result (type 4, 144 leaves):

$$\frac{1}{16} a \left(2 i \pi^3-16 \text{ArcTanh}[a x]^3-\frac{16 \text{ArcTanh}[a x]^3}{a x}+6 \text{ArcTanh}[a x]^4-3 \text{Cosh}[2 \text{ArcTanh}[a x]]-6 \text{ArcTanh}[a x]^2 \text{Cosh}[2 \text{ArcTanh}[a x]]+48 \text{ArcTanh}[a x]^2 \text{Log}\left[1-e^{2 \text{ArcTanh}[a x]}\right]+48 \text{ArcTanh}[a x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[a x]}\right]-24 \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[a x]}\right]+6 \text{ArcTanh}[a x] \text{Sinh}[2 \text{ArcTanh}[a x]]+4 \text{ArcTanh}[a x]^3 \text{Sinh}[2 \text{ArcTanh}[a x]]\right)$$

Problem 282: Attempted integration timed out after 120 seconds.

$$\int \frac{x^3}{\left(1-a^2 x^2\right)^2 \text{ArcTanh}[a x]} \, dx$$

Optimal (type 9, 42 leaves, 0 steps):

$$\frac{\text{SinhIntegral}[2 \text{ArcTanh}[a x]]}{2 a^4} - \frac{\text{Unintegrable}\left[\frac{x}{\left(1-a^2 x^2\right) \text{ArcTanh}[a x]}, x\right]}{a^2}$$

Result (type 1, 1 leaves):

???

Problem 312: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}[a x]^2}{x \left(1-a^2 x^2\right)^3} \, dx$$

Optimal (type 4, 196 leaves, 13 steps):

$$\frac{1}{32 \left(1-a^2 x^2\right)^2} + \frac{11}{32 \left(1-a^2 x^2\right)} - \frac{a x \text{ArcTanh}[a x]}{8 \left(1-a^2 x^2\right)^2} - \frac{11 a x \text{ArcTanh}[a x]}{16 \left(1-a^2 x^2\right)} - \frac{11}{32} \text{ArcTanh}[a x]^2 + \frac{\text{ArcTanh}[a x]^2}{4 \left(1-a^2 x^2\right)^2} + \frac{\text{ArcTanh}[a x]^2}{2 \left(1-a^2 x^2\right)} + \frac{1}{3} \text{ArcTanh}[a x]^3 + \text{ArcTanh}[a x]^2 \text{Log}\left[2-\frac{2}{1+a x}\right] - \text{ArcTanh}[a x] \text{PolyLog}\left[2, -1+\frac{2}{1+a x}\right] - \frac{1}{2} \text{PolyLog}\left[3, -1+\frac{2}{1+a x}\right]$$

Result (type 4, 129 leaves):

$$\text{ArcTanh}[a x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[a x]}\right] + \frac{1}{768} \left(32 i \pi^3 - 256 \text{ArcTanh}[a x]^3 + 144 \text{Cosh}[2 \text{ArcTanh}[a x]] + 3 \text{Cosh}[4 \text{ArcTanh}[a x]] + 24 \text{ArcTanh}[a x]^2 \left(12 \text{Cosh}[2 \text{ArcTanh}[a x]] + \text{Cosh}[4 \text{ArcTanh}[a x]] + 32 \text{Log}\left[1-e^{2 \text{ArcTanh}[a x]}\right]\right) - 384 \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[a x]}\right] - 12 \text{ArcTanh}[a x] \left(24 \text{Sinh}[2 \text{ArcTanh}[a x]] + \text{Sinh}[4 \text{ArcTanh}[a x]]\right)\right)$$

Problem 319: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}[a x]^3}{x^2 \left(1-a^2 x^2\right)^3} \, dx$$

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

$$-\frac{3\,a}{128\,\left(1-a^2\,x^2\right)^2}-\frac{93\,a}{128\,\left(1-a^2\,x^2\right)}+\frac{3\,a^2\,x\,\text{ArcTanh}[a\,x]}{32\,\left(1-a^2\,x^2\right)^2}+\frac{93\,a^2\,x\,\text{ArcTanh}[a\,x]}{64\,\left(1-a^2\,x^2\right)}+\frac{93}{128}\,a\,\text{ArcTanh}[a\,x]^2-\frac{3\,a\,\text{ArcTanh}[a\,x]^2}{16\,\left(1-a^2\,x^2\right)^2}-\frac{21\,a\,\text{ArcTanh}[a\,x]^2}{16\,\left(1-a^2\,x^2\right)}+a\,\text{ArcTanh}[a\,x]^3-\frac{\text{ArcTanh}[a\,x]^3}{x}+\frac{a^2\,x\,\text{ArcTanh}[a\,x]^3}{4\,\left(1-a^2\,x^2\right)^2}+\frac{7\,a^2\,x\,\text{ArcTanh}[a\,x]^3}{8\,\left(1-a^2\,x^2\right)}+\frac{15}{32}\,a\,\text{ArcTanh}[a\,x]^4+3\,a\,\text{ArcTanh}[a\,x]^2\,\text{Log}\left[2-\frac{2}{1+a\,x}\right]-3\,a\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[2,-1+\frac{2}{1+a\,x}\right]-\frac{3}{2}\,a\,\text{PolyLog}\left[3,-1+\frac{2}{1+a\,x}\right]$$

Result (type 4, 218 leaves):

$$-a\left(-\frac{i\,\pi^3}{8}+\text{ArcTanh}[a\,x]^3+\frac{\text{ArcTanh}[a\,x]^3}{a\,x}-\frac{a\,x\,\text{ArcTanh}[a\,x]^3}{1-a^2\,x^2}-\frac{15}{32}\,\text{ArcTanh}[a\,x]^4+\frac{3}{8}\,\text{Cosh}[2\,\text{ArcTanh}[a\,x]]+\frac{3}{4}\,\text{ArcTanh}[a\,x]^2\,\text{Cosh}[2\,\text{ArcTanh}[a\,x]]+\frac{3\,\text{Cosh}[4\,\text{ArcTanh}[a\,x]]}{1024}+\frac{3}{128}\,\text{ArcTanh}[a\,x]^2\,\text{Cosh}[4\,\text{ArcTanh}[a\,x]]-3\,\text{ArcTanh}[a\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a\,x]}\right]-3\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[a\,x]}\right]+\frac{3}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[a\,x]}\right]-\frac{3}{4}\,\text{ArcTanh}[a\,x]\,\text{Sinh}[2\,\text{ArcTanh}[a\,x]]-\frac{3}{256}\,\text{ArcTanh}[a\,x]\,\text{Sinh}[4\,\text{ArcTanh}[a\,x]]-\frac{1}{32}\,\text{ArcTanh}[a\,x]^3\,\text{Sinh}[4\,\text{ArcTanh}[a\,x]]\right)$$

Problem 383: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 153 leaves, 10 steps):

$$\frac{2\,\text{ArcTan}\left[e^{\text{ArcTanh}[a\,x]}\right]\,\text{ArcTanh}[a\,x]^3}{a}-\frac{3\,i\,\text{ArcTanh}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{\text{ArcTanh}[a\,x]}\right]}{a}+\frac{3\,i\,\text{ArcTanh}[a\,x]^2\,\text{PolyLog}\left[2,i\,e^{\text{ArcTanh}[a\,x]}\right]}{a}+\frac{6\,i\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[3,-i\,e^{\text{ArcTanh}[a\,x]}\right]}{a}-\frac{6\,i\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\left[3,i\,e^{\text{ArcTanh}[a\,x]}\right]}{a}-\frac{6\,i\,\text{PolyLog}\left[4,-i\,e^{\text{ArcTanh}[a\,x]}\right]}{a}+\frac{6\,i\,\text{PolyLog}\left[4,i\,e^{\text{ArcTanh}[a\,x]}\right]}{a}$$

Result (type 4, 451 leaves):

$$-\frac{1}{64\,a}\,i\,\Big(7\,\pi^4+8\,i\,\pi^3\,\text{ArcTanh}[a\,x]+24\,\pi^2\,\text{ArcTanh}[a\,x]^2-32\,i\,\pi\,\text{ArcTanh}[a\,x]^3-16\,\text{ArcTanh}[a\,x]^4+8\,i\,\pi^3\,\text{Log}\big[1+i\,e^{-\text{ArcTanh}[a\,x]}\big]+$$
$$48\,\pi^2\,\text{ArcTanh}[a\,x]\,\text{Log}\big[1+i\,e^{-\text{ArcTanh}[a\,x]}\big]-96\,i\,\pi\,\text{ArcTanh}[a\,x]^2\,\text{Log}\big[1+i\,e^{-\text{ArcTanh}[a\,x]}\big]-64\,\text{ArcTanh}[a\,x]^3\,\text{Log}\big[1+i\,e^{-\text{ArcTanh}[a\,x]}\big]-$$
$$48\,\pi^2\,\text{ArcTanh}[a\,x]\,\text{Log}\big[1-i\,e^{\text{ArcTanh}[a\,x]}\big]+96\,i\,\pi\,\text{ArcTanh}[a\,x]^2\,\text{Log}\big[1-i\,e^{\text{ArcTanh}[a\,x]}\big]-8\,i\,\pi^3\,\text{Log}\big[1+i\,e^{\text{ArcTanh}[a\,x]}\big]+$$
$$64\,\text{ArcTanh}[a\,x]^3\,\text{Log}\big[1+i\,e^{\text{ArcTanh}[a\,x]}\big]+8\,i\,\pi^3\,\text{Log}\Big[\text{Tan}\Big[\frac{1}{4}\,\big(\pi+2\,i\,\text{ArcTanh}[a\,x]\big)\Big]\Big]-48\,\big(\pi-2\,i\,\text{ArcTanh}[a\,x]\big)^2\,\text{PolyLog}\big[2,\,-i\,e^{-\text{ArcTanh}[a\,x]}\big]+$$
$$192\,\text{ArcTanh}[a\,x]^2\,\text{PolyLog}\big[2,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]-48\,\pi^2\,\text{PolyLog}\big[2,\,i\,e^{\text{ArcTanh}[a\,x]}\big]+192\,i\,\pi\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\big[2,\,i\,e^{\text{ArcTanh}[a\,x]}\big]+$$
$$192\,i\,\pi\,\text{PolyLog}\big[3,\,-i\,e^{-\text{ArcTanh}[a\,x]}\big]+384\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\big[3,\,-i\,e^{-\text{ArcTanh}[a\,x]}\big]-384\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\big[3,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]-$$
$$192\,i\,\pi\,\text{PolyLog}\big[3,\,i\,e^{\text{ArcTanh}[a\,x]}\big]+384\,\text{PolyLog}\big[4,\,-i\,e^{-\text{ArcTanh}[a\,x]}\big]+384\,\text{PolyLog}\big[4,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]\Big)$$

Problem 405: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 246 leaves, 13 steps):

$$-\frac{6}{a^3\,\sqrt{1-a^2\,x^2}}+\frac{6\,x\,\text{ArcTanh}[a\,x]}{a^2\,\sqrt{1-a^2\,x^2}}-\frac{3\,\text{ArcTanh}[a\,x]^2}{a^3\,\sqrt{1-a^2\,x^2}}+\frac{x\,\text{ArcTanh}[a\,x]^3}{a^2\,\sqrt{1-a^2\,x^2}}-\frac{2\,\text{ArcTan}\big[e^{\text{ArcTanh}[a\,x]}\big]\,\text{ArcTanh}[a\,x]^3}{a^3}+$$
$$\frac{3\,i\,\text{ArcTanh}[a\,x]^2\,\text{PolyLog}\big[2,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]}{a^3}-\frac{3\,i\,\text{ArcTanh}[a\,x]^2\,\text{PolyLog}\big[2,\,i\,e^{\text{ArcTanh}[a\,x]}\big]}{a^3}-\frac{6\,i\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\big[3,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]}{a^3}+$$
$$\frac{6\,i\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\big[3,\,i\,e^{\text{ArcTanh}[a\,x]}\big]}{a^3}+\frac{6\,i\,\text{PolyLog}\big[4,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]}{a^3}-\frac{6\,i\,\text{PolyLog}\big[4,\,i\,e^{\text{ArcTanh}[a\,x]}\big]}{a^3}$$

Result (type 4, 541 leaves):

$$\frac{1}{64\,a^3}\Big(7\,i\,\pi^4-\frac{384}{\sqrt{1-a^2\,x^2}}-8\,\pi^3\,\text{ArcTanh}[a\,x]+\frac{384\,a\,x\,\text{ArcTanh}[a\,x]}{\sqrt{1-a^2\,x^2}}+24\,i\,\pi^2\,\text{ArcTanh}[a\,x]^2-\frac{192\,\text{ArcTanh}[a\,x]^2}{\sqrt{1-a^2\,x^2}}+32\,\pi\,\text{ArcTanh}[a\,x]^3+$$
$$\frac{64\,a\,x\,\text{ArcTanh}[a\,x]^3}{\sqrt{1-a^2\,x^2}}-16\,i\,\text{ArcTanh}[a\,x]^4-8\,\pi^3\,\text{Log}\big[1+i\,e^{-\text{ArcTanh}[a\,x]}\big]+48\,i\,\pi^2\,\text{ArcTanh}[a\,x]\,\text{Log}\big[1+i\,e^{-\text{ArcTanh}[a\,x]}\big]+$$
$$96\,\pi\,\text{ArcTanh}[a\,x]^2\,\text{Log}\big[1+i\,e^{-\text{ArcTanh}[a\,x]}\big]-64\,i\,\text{ArcTanh}[a\,x]^3\,\text{Log}\big[1+i\,e^{-\text{ArcTanh}[a\,x]}\big]-48\,i\,\pi^2\,\text{ArcTanh}[a\,x]\,\text{Log}\big[1-i\,e^{\text{ArcTanh}[a\,x]}\big]-$$
$$96\,\pi\,\text{ArcTanh}[a\,x]^2\,\text{Log}\big[1-i\,e^{\text{ArcTanh}[a\,x]}\big]+8\,\pi^3\,\text{Log}\big[1+i\,e^{\text{ArcTanh}[a\,x]}\big]+64\,i\,\text{ArcTanh}[a\,x]^3\,\text{Log}\big[1+i\,e^{\text{ArcTanh}[a\,x]}\big]-$$
$$8\,\pi^3\,\text{Log}\Big[\text{Tan}\Big[\frac{1}{4}\,\big(\pi+2\,i\,\text{ArcTanh}[a\,x]\big)\Big]\Big]-48\,i\,\big(\pi-2\,i\,\text{ArcTanh}[a\,x]\big)^2\,\text{PolyLog}\big[2,\,-i\,e^{-\text{ArcTanh}[a\,x]}\big]+$$
$$192\,i\,\text{ArcTanh}[a\,x]^2\,\text{PolyLog}\big[2,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]-48\,i\,\pi^2\,\text{PolyLog}\big[2,\,i\,e^{\text{ArcTanh}[a\,x]}\big]-192\,\pi\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\big[2,\,i\,e^{\text{ArcTanh}[a\,x]}\big]-$$
$$192\,\pi\,\text{PolyLog}\big[3,\,-i\,e^{-\text{ArcTanh}[a\,x]}\big]+384\,i\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\big[3,\,-i\,e^{-\text{ArcTanh}[a\,x]}\big]-384\,i\,\text{ArcTanh}[a\,x]\,\text{PolyLog}\big[3,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]+$$
$$192\,\pi\,\text{PolyLog}\big[3,\,i\,e^{\text{ArcTanh}[a\,x]}\big]+384\,i\,\text{PolyLog}\big[4,\,-i\,e^{-\text{ArcTanh}[a\,x]}\big]+384\,i\,\text{PolyLog}\big[4,\,-i\,e^{\text{ArcTanh}[a\,x]}\big]\Big)$$

Problem 412: Attempted integration timed out after 120 seconds.

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

Optimal (type 9, 26 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 458: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(1-a^2 x^2\right)^{3/2} \text{ArcTanh}[a x]}{x^7} \, dx$$

Optimal (type 4, 243 leaves, 24 steps):

$$-\frac{a \sqrt{1-a^2 x^2}}{30 x^5}+\frac{19 a^3 \sqrt{1-a^2 x^2}}{360 x^3}+\frac{31 a^5 \sqrt{1-a^2 x^2}}{720 x}-\frac{\sqrt{1-a^2 x^2} \text{ ArcTanh}[a x]}{6 x^6}+\frac{7 a^2 \sqrt{1-a^2 x^2} \text{ ArcTanh}[a x]}{24 x^4}-$$
$$\frac{a^4 \sqrt{1-a^2 x^2} \text{ ArcTanh}[a x]}{16 x^2}-\frac{1}{8} a^6 \text{ArcTanh}[a x] \text{ ArcTanh}\left[\frac{\sqrt{1-a x}}{\sqrt{1+a x}}\right]+\frac{1}{16} a^6 \text{PolyLog}\left[2,-\frac{\sqrt{1-a x}}{\sqrt{1+a x}}\right]-\frac{1}{16} a^6 \text{PolyLog}\left[2,\frac{\sqrt{1-a x}}{\sqrt{1+a x}}\right]$$

Result (type 4, 530 leaves):

$$-\frac{1}{192} a^6 \left(-8 \operatorname{Coth}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right] - 6 \operatorname{ArcTanh}[a x] \operatorname{Csch}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^2 - \frac{a x \operatorname{Csch}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4}{\sqrt{1-a^2 x^2}} - 3 \operatorname{ArcTanh}[a x] \operatorname{Csch}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4 - 24 \operatorname{ArcTanh}[a x] \operatorname{Log}\left[1 - e^{-\operatorname{ArcTanh}[a x]}\right] + 24 \operatorname{ArcTanh}[a x] \operatorname{Log}\left[1 + e^{-\operatorname{ArcTanh}[a x]}\right] - 24 \operatorname{PolyLog}\left[2, -e^{-\operatorname{ArcTanh}[a x]}\right] + 24 \operatorname{PolyLog}\left[2, e^{-\operatorname{ArcTanh}[a x]}\right] - 6 \operatorname{ArcTanh}[a x] \operatorname{Sech}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^2 + 3 \operatorname{ArcTanh}[a x] \operatorname{Sech}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4 - \frac{16 \left(1-a^2 x^2\right)^{3/2} \operatorname{Sinh}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4}{a^3 x^3} + 8 \operatorname{Tanh}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]\right) +$$

$$\frac{1}{5760} a^6 \left(-76 \operatorname{Coth}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right] - 90 \operatorname{ArcTanh}[a x] \operatorname{Csch}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^2 - \frac{26 a x \operatorname{Csch}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4}{\sqrt{1-a^2 x^2}} - 90 \operatorname{ArcTanh}[a x] \operatorname{Csch}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4 - \frac{3 a x \operatorname{Csch}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^6}{\sqrt{1-a^2 x^2}} - 15 \operatorname{ArcTanh}[a x] \operatorname{Csch}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^6 - 360 \operatorname{ArcTanh}[a x] \operatorname{Log}\left[1 - e^{-\operatorname{ArcTanh}[a x]}\right] + 360 \operatorname{ArcTanh}[a x] \operatorname{Log}\left[1 + e^{-\operatorname{ArcTanh}[a x]}\right] - 360 \operatorname{PolyLog}\left[2, -e^{-\operatorname{ArcTanh}[a x]}\right] + 360 \operatorname{PolyLog}\left[2, e^{-\operatorname{ArcTanh}[a x]}\right] - 90 \operatorname{ArcTanh}[a x] \operatorname{Sech}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^2 + 90 \operatorname{ArcTanh}[a x] \operatorname{Sech}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4 - 15 \operatorname{ArcTanh}[a x] \operatorname{Sech}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^6 - \frac{416 \left(1-a^2 x^2\right)^{3/2} \operatorname{Sinh}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4}{a^3 x^3} + 76 \operatorname{Tanh}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right] + 6 \operatorname{Sech}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]^4 \operatorname{Tanh}\left[\frac{1}{2} \operatorname{ArcTanh}[a x]\right]\right)$$

Problem 502: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 429 leaves, 17 steps):

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

Result (type 4, 662 leaves):

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

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

$$\left(\text{ArcCos}\left[\frac{-a^2 c+d}{a^2 c+d}\right]+2\left(\text{ArcTan}\left[\frac{a c}{\sqrt{a^2 c d}\;x}\right]+\text{ArcTan}\left[\frac{a d x}{\sqrt{a^2 c d}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{2}\sqrt{a^2 c d}\;e^{-\text{ArcTanh}[a x]}}{\sqrt{a^2 c+d}\sqrt{a^2 c-d+\left(a^2 c+d\right)\text{Cosh}[2\,\text{ArcTanh}[a x]]}}\right]+$$

$$\left(\text{ArcCos}\left[\frac{-a^2 c+d}{a^2 c+d}\right]-2\left(\text{ArcTan}\left[\frac{a c}{\sqrt{a^2 c d}\;x}\right]+\text{ArcTan}\left[\frac{a d x}{\sqrt{a^2 c d}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{2}\sqrt{a^2 c d}\;e^{\text{ArcTanh}[a x]}}{\sqrt{a^2 c+d}\sqrt{a^2 c-d+\left(a^2 c+d\right)\text{Cosh}[2\,\text{ArcTanh}[a x]]}}\right]+$$

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

Problem 504: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 657 leaves, 23 steps):

$$\frac{a}{8 c\left(a^2 c+d\right)\left(c+d x^2\right)}+\frac{x\,\text{ArcTanh}[a x]}{4 c\left(c+d x^2\right)^2}+\frac{3 x\,\text{ArcTanh}[a x]}{8 c^2\left(c+d x^2\right)}+\frac{3\,\text{ArcTan}\left[\frac{\sqrt{d}\,x}{\sqrt{c}}\right]\text{ArcTanh}[a x]}{8 c^{5/2}\sqrt{d}}+$$

$$\frac{3\,i\,\text{Log}\left[\frac{\sqrt{d}\,(1-a x)}{i\,a\sqrt{c}+\sqrt{d}}\right]\text{Log}\left[1-\frac{i\sqrt{d}\,x}{\sqrt{c}}\right]}{32 c^{5/2}\sqrt{d}}-\frac{3\,i\,\text{Log}\left[-\frac{\sqrt{d}\,(1+a x)}{i\,a\sqrt{c}-\sqrt{d}}\right]\text{Log}\left[1-\frac{i\sqrt{d}\,x}{\sqrt{c}}\right]}{32 c^{5/2}\sqrt{d}}-\frac{3\,i\,\text{Log}\left[-\frac{\sqrt{d}\,(1-a x)}{i\,a\sqrt{c}-\sqrt{d}}\right]\text{Log}\left[1+\frac{i\sqrt{d}\,x}{\sqrt{c}}\right]}{32 c^{5/2}\sqrt{d}}+$$

$$\frac{3\,i\,\text{Log}\left[\frac{\sqrt{d}\,(1+a x)}{i\,a\sqrt{c}+\sqrt{d}}\right]\text{Log}\left[1+\frac{i\sqrt{d}\,x}{\sqrt{c}}\right]}{32 c^{5/2}\sqrt{d}}+\frac{a\left(5 a^2 c+3 d\right)\text{Log}\left[1-a^2 x^2\right]}{16 c^2\left(a^2 c+d\right)^2}-\frac{a\left(5 a^2 c+3 d\right)\text{Log}\left[c+d x^2\right]}{16 c^2\left(a^2 c+d\right)^2}+$$

$$\frac{3\,i\,\text{PolyLog}\left[2,\frac{a\left(\sqrt{c}-i\sqrt{d}\,x\right)}{a\sqrt{c}-i\sqrt{d}}\right]}{32 c^{5/2}\sqrt{d}}-\frac{3\,i\,\text{PolyLog}\left[2,\frac{a\left(\sqrt{c}-i\sqrt{d}\,x\right)}{a\sqrt{c}+i\sqrt{d}}\right]}{32 c^{5/2}\sqrt{d}}+\frac{3\,i\,\text{PolyLog}\left[2,\frac{a\left(\sqrt{c}+i\sqrt{d}\,x\right)}{a\sqrt{c}-i\sqrt{d}}\right]}{32 c^{5/2}\sqrt{d}}-\frac{3\,i\,\text{PolyLog}\left[2,\frac{a\left(\sqrt{c}+i\sqrt{d}\,x\right)}{a\sqrt{c}+i\sqrt{d}}\right]}{32 c^{5/2}\sqrt{d}}$$

Result (type 4, 1840 leaves):

$$a^5\left(-\frac{5\,\text{Log}\left[1+\frac{\left(a^2 c+d\right)\,\text{Cosh}[2\,\text{ArcTanh}[a\,x]]}{a^2 c-d}\right]}{16\,a^2 c\,\left(a^2 c+d\right)^2}-\frac{3\,d\,\text{Log}\left[1+\frac{\left(a^2 c+d\right)\,\text{Cosh}[2\,\text{ArcTanh}[a\,x]]}{a^2 c-d}\right]}{16\,a^4 c^2\,\left(a^2 c+d\right)^2}-\right.$$

$$\frac{1}{32\,a^2 c\,\sqrt{a^2 c\,d}\,\left(a^2 c+d\right)}\,3\left(-2\,\mathrm{i}\,\text{ArcCos}\left[-\frac{a^2 c-d}{a^2 c+d}\right]\,\text{ArcTan}\left[\frac{a\,d\,x}{\sqrt{a^2 c\,d}}\right]+4\,\text{ArcTan}\left[\frac{a\,c}{\sqrt{a^2 c\,d}\,x}\right]\,\text{ArcTanh}[a\,x]-\right.$$

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

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

$$\left(\text{ArcCos}\left[-\frac{a^2 c-d}{a^2 c+d}\right]+2\,\mathrm{i}\,\left(-\mathrm{i}\,\text{ArcTan}\left[\frac{a\,c}{\sqrt{a^2 c\,d}\,x}\right]-\mathrm{i}\,\text{ArcTan}\left[\frac{a\,d\,x}{\sqrt{a^2 c\,d}}\right]\right)\right)\,\text{Log}\left[\frac{\sqrt{2}\,\sqrt{a^2 c\,d}\,e^{-\text{ArcTanh}[a\,x]}}{\sqrt{a^2 c+d}\,\sqrt{a^2 c-d+\left(a^2 c+d\right)\,\text{Cosh}[2\,\text{ArcTanh}[a\,x]]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{a^2 c-d}{a^2 c+d}\right]-2\,\mathrm{i}\,\left(-\mathrm{i}\,\text{ArcTan}\left[\frac{a\,c}{\sqrt{a^2 c\,d}\,x}\right]-\mathrm{i}\,\text{ArcTan}\left[\frac{a\,d\,x}{\sqrt{a^2 c\,d}}\right]\right)\right)\,\text{Log}\left[\frac{\sqrt{2}\,\sqrt{a^2 c\,d}\,e^{\text{ArcTanh}[a\,x]}}{\sqrt{a^2 c+d}\,\sqrt{a^2 c-d+\left(a^2 c+d\right)\,\text{Cosh}[2\,\text{ArcTanh}[a\,x]]}}\right]+$$

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

$$\frac{1}{32\,a^4 c^2\,\sqrt{a^2 c\,d}\,\left(a^2 c+d\right)}\,3\,d\left(-2\,\mathrm{i}\,\text{ArcCos}\left[-\frac{a^2 c-d}{a^2 c+d}\right]\,\text{ArcTan}\left[\frac{a\,d\,x}{\sqrt{a^2 c\,d}}\right]+4\,\text{ArcTan}\left[\frac{a\,c}{\sqrt{a^2 c\,d}\,x}\right]\,\text{ArcTanh}[a\,x]-\right.$$

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

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

$$\left(\text{ArcCos}\left[-\frac{a^2 c-d}{a^2 c+d}\right]+2\,\mathrm{i}\,\left(-\mathrm{i}\,\text{ArcTan}\left[\frac{a\,c}{\sqrt{a^2 c\,d}\,x}\right]-\mathrm{i}\,\text{ArcTan}\left[\frac{a\,d\,x}{\sqrt{a^2 c\,d}}\right]\right)\right)\,\text{Log}\left[\frac{\sqrt{2}\,\sqrt{a^2 c\,d}\,e^{-\text{ArcTanh}[a\,x]}}{\sqrt{a^2 c+d}\,\sqrt{a^2 c-d+\left(a^2 c+d\right)\,\text{Cosh}[2\,\text{ArcTanh}[a\,x]]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{a^2 c-d}{a^2 c+d}\right]-2\,\mathrm{i}\,\left(-\mathrm{i}\,\text{ArcTan}\left[\frac{a\,c}{\sqrt{a^2 c\,d}\,x}\right]-\mathrm{i}\,\text{ArcTan}\left[\frac{a\,d\,x}{\sqrt{a^2 c\,d}}\right]\right)\right)\,\text{Log}\left[\frac{\sqrt{2}\,\sqrt{a^2 c\,d}\,e^{\text{ArcTanh}[a\,x]}}{\sqrt{a^2 c+d}\,\sqrt{a^2 c-d+\left(a^2 c+d\right)\,\text{Cosh}[2\,\text{ArcTanh}[a\,x]]}}\right]+$$

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

$$\frac{d\,\text{ArcTanh}[a x]\,\text{Sinh}[2\,\text{ArcTanh}[a x]]}{2 a^2 c\left(a^2 c+d\right)\left(a^2 c-d+a^2 c\,\text{Cosh}[2\,\text{ArcTanh}[a x]]+d\,\text{Cosh}[2\,\text{ArcTanh}[a x]]\right)^2}+$$

$$\left(2 a^2 c d+5 a^4 c^2\,\text{ArcTanh}[a x]\,\text{Sinh}[2\,\text{ArcTanh}[a x]]+8 a^2 c d\,\text{ArcTanh}[a x]\,\text{Sinh}[2\,\text{ArcTanh}[a x]]+3 d^2\,\text{ArcTanh}[a x]\,\text{Sinh}[2\,\text{ArcTanh}[a x]]\right)\Big/$$

$$\left(8 a^4 c^2\left(a^2 c+d\right)^2\left(a^2 c-d+a^2 c\,\text{Cosh}[2\,\text{ArcTanh}[a x]]+d\,\text{Cosh}[2\,\text{ArcTanh}[a x]]\right)\right)\Bigg)$$

Problem 506: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcTanh}[b x]}{1-x^2}\,dx$$

Optimal (type 4, 171 leaves, 17 steps):

$$\frac{1}{4}\text{Log}\left[-\frac{b(1-x)}{1-b}\right]\text{Log}[1-b x]-\frac{1}{4}\text{Log}\left[\frac{b(1+x)}{1+b}\right]\text{Log}[1-b x]-\frac{1}{4}\text{Log}\left[\frac{b(1-x)}{1+b}\right]\text{Log}[1+b x]+$$

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

Result (type 4, 576 leaves):

$$-\frac{1}{4\sqrt{-b^2}}$$

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

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

$$\left(\text{ArcCos}\left[\frac{1+b^2}{1-b^2}\right]-2\left(\text{ArcTan}\left[\frac{\sqrt{-b^2}}{b\,x}\right]+\text{ArcTan}\left[\frac{b\,x}{\sqrt{-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{2}\,\sqrt{-b^2}\,e^{-\text{ArcTanh}[b\,x]}}{\sqrt{-1+b^2}\,\sqrt{1+b^2+(-1+b^2)\,\text{Cosh}[2\,\text{ArcTanh}[b\,x]]}}\right]+$$

$$\left(\text{ArcCos}\left[\frac{1+b^2}{1-b^2}\right]+2\left(\text{ArcTan}\left[\frac{\sqrt{-b^2}}{b\,x}\right]+\text{ArcTan}\left[\frac{b\,x}{\sqrt{-b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{2}\,\sqrt{-b^2}\,e^{\text{ArcTanh}[b\,x]}}{\sqrt{-1+b^2}\,\sqrt{1+b^2+(-1+b^2)\,\text{Cosh}[2\,\text{ArcTanh}[b\,x]]}}\right]+$$

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

Problem 507: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{ArcTanh}[a+b\,x]}{1-x^2}\,dx$$

Optimal (type 4, 203 leaves, 17 steps):

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

$$\frac{1}{4}\text{PolyLog}\left[2,\frac{1-a-b\,x}{1-a-b}\right]-\frac{1}{4}\text{PolyLog}\left[2,\frac{1-a-b\,x}{1-a+b}\right]+\frac{1}{4}\text{PolyLog}\left[2,\frac{1+a+b\,x}{1+a-b}\right]-\frac{1}{4}\text{PolyLog}\left[2,\frac{1+a+b\,x}{1+a+b}\right]$$

Result (type 4, 646 leaves):

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

Problem 508: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 86 leaves, 4 steps):

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

Result (type 4, 260 leaves):

$$\frac{1}{8\,b}\Bigg(-\pi^2+4\,\text{ArcTanh}\left[\frac{a}{b}\right]^2+4\,i\,\pi\,\text{ArcTanh}[x]+8\,\text{ArcTanh}\left[\frac{a}{b}\right]\text{ArcTanh}[x]+8\,\text{ArcTanh}[x]^2-4\,i\,\pi\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[x]}\right]-8\,\text{ArcTanh}[x]\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[x]}\right]+8\,\text{ArcTanh}\left[\frac{a}{b}\right]\text{Log}\left[1-e^{-2\left(\text{ArcTanh}\left[\frac{a}{b}\right]+\text{ArcTanh}[x]\right)}\right]+8\,\text{ArcTanh}[x]\,\text{Log}\left[1-e^{-2\left(\text{ArcTanh}\left[\frac{a}{b}\right]+\text{ArcTanh}[x]\right)}\right]+4\,i\,\pi\,\text{Log}\left[\frac{2}{\sqrt{1-x^2}}\right]+8\,\text{ArcTanh}[x]\,\text{Log}\left[\frac{2}{\sqrt{1-x^2}}\right]+4\,\text{ArcTanh}[x]\,\text{Log}\left[1-x^2\right]+8\,\text{ArcTanh}[x]\,\text{Log}\left[i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{a}{b}\right]+\text{ArcTanh}[x]\right]\right]-8\,\text{ArcTanh}\left[\frac{a}{b}\right]\text{Log}\left[2\,i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{a}{b}\right]+\text{ArcTanh}[x]\right]\right]-8\,\text{ArcTanh}[x]\,\text{Log}\left[2\,i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{a}{b}\right]+\text{ArcTanh}[x]\right]\right]-4\,\text{PolyLog}\left[2,-e^{2\,\text{ArcTanh}[x]}\right]-4\,\text{PolyLog}\left[2,e^{-2\left(\text{ArcTanh}\left[\frac{a}{b}\right]+\text{ArcTanh}[x]\right)}\right]\Bigg)$$

Problem 509: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 397 leaves, 17 steps):

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

Result (type 4, 485 leaves):

$$-\frac{1}{4\sqrt{a\,b}}\left(-2\,i\,\text{ArcCos}\left[\frac{-a+b}{a+b}\right]\text{ArcTan}\left[\frac{b\,x}{\sqrt{a\,b}}\right]+4\,\text{ArcTan}\left[\frac{a}{\sqrt{a\,b}\;x}\right]\text{ArcTanh}[x]-\right.$$

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

$$\left(\text{ArcCos}\left[\frac{-a+b}{a+b}\right]+2\left(\text{ArcTan}\left[\frac{a}{\sqrt{a\,b}\;x}\right]+\text{ArcTan}\left[\frac{b\,x}{\sqrt{a\,b}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{2}\,\sqrt{a\,b}\;e^{-\text{ArcTanh}[x]}}{\sqrt{a+b}\,\sqrt{a-b+(a+b)\,\text{Cosh}[2\,\text{ArcTanh}[x]]}}\right]+$$

$$\left(\text{ArcCos}\left[\frac{-a+b}{a+b}\right]-2\left(\text{ArcTan}\left[\frac{a}{\sqrt{a\,b}\;x}\right]+\text{ArcTan}\left[\frac{b\,x}{\sqrt{a\,b}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{2}\,\sqrt{a\,b}\;e^{\text{ArcTanh}[x]}}{\sqrt{a+b}\,\sqrt{a-b+(a+b)\,\text{Cosh}[2\,\text{ArcTanh}[x]]}}\right]+$$

$$\left.i\left(-\text{PolyLog}\left[2,\frac{\left(-a+b-2\,i\sqrt{a\,b}\right)\left(i\,a+\sqrt{a\,b}\;x\right)}{(a+b)\left(-i\,a+\sqrt{a\,b}\;x\right)}\right]+\text{PolyLog}\left[2,\frac{\left(-a+b+2\,i\sqrt{a\,b}\right)\left(i\,a+\sqrt{a\,b}\;x\right)}{(a+b)\left(-i\,a+\sqrt{a\,b}\;x\right)}\right]\right)\right)$$

Problem 510: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

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

Result (type 4, 910 leaves):

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

$$2c\left(-1+\sqrt{\frac{c\,(a+b+c)}{-b^2+4ac}}\,e^{i\,\text{ArcTan}\left[\frac{-b-2c}{\sqrt{-b^2+4ac}}\right]}+\sqrt{\frac{c\,(a-b+c)}{-b^2+4ac}}\,e^{i\,\text{ArcTan}\left[\frac{-b+2c}{\sqrt{-b^2+4ac}}\right]}\right)\Bigg)\,\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]^2+$$

$$\left(b^2-4c^2\right)\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\left(-i\,\text{ArcTan}\left[\frac{-b-2c}{\sqrt{-b^2+4ac}}\right]+i\,\text{ArcTan}\left[\frac{-b+2c}{\sqrt{-b^2+4ac}}\right]+2\,\text{ArcTanh}[x]+\right.$$

$$\left.\text{Log}\left[1-e^{2i\left(\text{ArcTan}\left[\frac{-b-2c}{\sqrt{-b^2+4ac}}\right]+\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\right)}\right]-\text{Log}\left[1-e^{2i\left(\text{ArcTan}\left[\frac{-b+2c}{\sqrt{-b^2+4ac}}\right]+\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\right)}\right]\right)+\left(b^2-4c^2\right)$$

$$\left(\text{ArcTan}\left[\frac{-b-2c}{\sqrt{-b^2+4ac}}\right]\left(\text{Log}\left[1-e^{2i\left(\text{ArcTan}\left[\frac{-b-2c}{\sqrt{-b^2+4ac}}\right]+\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\right)}\right]-\text{Log}\left[\text{Sin}\left[\text{ArcTan}\left[\frac{-b-2c}{\sqrt{-b^2+4ac}}\right]+\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\right]\right]\right)+\right.$$

$$\left.\left.\text{ArcTan}\left[\frac{-b+2c}{\sqrt{-b^2+4ac}}\right]\left(-\text{Log}\left[1-e^{2i\left(\text{ArcTan}\left[\frac{-b+2c}{\sqrt{-b^2+4ac}}\right]+\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\right)}\right]+\text{Log}\left[\text{Sin}\left[\text{ArcTan}\left[\frac{-b+2c}{\sqrt{-b^2+4ac}}\right]+\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\right]\right]\right)\right)\right)-$$

$$\left.i\left(b^2-4c^2\right)\text{PolyLog}\left[2,\,e^{2i\left(\text{ArcTan}\left[\frac{-b-2c}{\sqrt{-b^2+4ac}}\right]+\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\right)}\right]+i\left(b^2-4c^2\right)\text{PolyLog}\left[2,\,e^{2i\left(\text{ArcTan}\left[\frac{-b+2c}{\sqrt{-b^2+4ac}}\right]+\text{ArcTan}\left[\frac{b+2cx}{\sqrt{-b^2+4ac}}\right]\right)}\right]\right)$$

Problem 527: Unable to integrate problem.

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

Optimal (type 4, 216 leaves, 14 steps):

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

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

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

$$b\,e\,\text{Log}[1-c\,x]\,\text{PolyLog}[2,1-c\,x]+b\,e\,\text{Log}[1+c\,x]\,\text{PolyLog}[2,1+c\,x]+b\,e\,\text{PolyLog}[3,1-c\,x]-b\,e\,\text{PolyLog}[3,1+c\,x]$$

Result (type 8, 29 leaves):

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

Problem 528: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 105 leaves, 6 steps):

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

Result (type 4, 332 leaves):

$$-\frac{1}{4\,x}\Big(4\,a\,d+4\,b\,d\,\text{ArcTanh}[c\,x]+8\,a\,c\,e\,x\,\text{ArcTanh}[c\,x]+4\,b\,c\,e\,x\,\text{ArcTanh}[c\,x]^2-4\,b\,c\,d\,x\,\text{Log}[x]-b\,c\,e\,x\,\text{Log}\left[-\frac{1}{c}+x\right]^2-$$
$$b\,c\,e\,x\,\text{Log}\left[\frac{1}{c}+x\right]^2-2\,b\,c\,e\,x\,\text{Log}\left[\frac{1}{c}+x\right]\,\text{Log}\left[\frac{1}{2}\,(1-c\,x)\right]+4\,b\,c\,e\,x\,\text{Log}[x]\,\text{Log}[1-c\,x]-2\,b\,c\,e\,x\,\text{Log}\left[-\frac{1}{c}+x\right]\,\text{Log}\left[\frac{1}{2}\,(1+c\,x)\right]+$$
$$4\,b\,c\,e\,x\,\text{Log}[x]\,\text{Log}[1+c\,x]+4\,a\,e\,\text{Log}[1-c^2\,x^2]+2\,b\,c\,d\,x\,\text{Log}[1-c^2\,x^2]+4\,b\,e\,\text{ArcTanh}[c\,x]\,\text{Log}[1-c^2\,x^2]-$$
$$4\,b\,c\,e\,x\,\text{Log}[x]\,\text{Log}[1-c^2\,x^2]+2\,b\,c\,e\,x\,\text{Log}\left[-\frac{1}{c}+x\right]\,\text{Log}[1-c^2\,x^2]+2\,b\,c\,e\,x\,\text{Log}\left[\frac{1}{c}+x\right]\,\text{Log}[1-c^2\,x^2]+$$
$$4\,b\,c\,e\,x\,\text{PolyLog}[2,-c\,x]+4\,b\,c\,e\,x\,\text{PolyLog}[2,c\,x]-2\,b\,c\,e\,x\,\text{PolyLog}\left[2,\frac{1}{2}-\frac{c\,x}{2}\right]-2\,b\,c\,e\,x\,\text{PolyLog}\left[2,\frac{1}{2}\,(1+c\,x)\right]\Big)$$

Problem 530: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{ArcTanh}[c\,x])\,(d+e\,\text{Log}[1-c^2\,x^2])}{x^4}\,dx$$

Optimal (type 4, 197 leaves, 15 steps):

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

Result (type 4, 460 leaves):

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

Problem 532: Unable to integrate problem.

$$\int\frac{(a+b\,\text{ArcTanh}[c\,x])\,\left(d+e\,\text{Log}\left[1-c^2\,x^2\right]\right)}{x^6}\,dx$$

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

$$\frac{7\,b\,c^3\,e}{60\,x^2}+\frac{2\,c^2\,e\,(a+b\,\text{ArcTanh}[c\,x])}{15\,x^3}+\frac{2\,c^4\,e\,(a+b\,\text{ArcTanh}[c\,x])}{5\,x}-\frac{c^5\,e\,(a+b\,\text{ArcTanh}[c\,x])^2}{5\,b}-$$
$$\frac{5}{6}\,b\,c^5\,e\,\text{Log}[x]+\frac{19}{60}\,b\,c^5\,e\,\text{Log}\left[1-c^2\,x^2\right]-\frac{b\,c\,\left(d+e\,\text{Log}\left[1-c^2\,x^2\right]\right)}{20\,x^4}-\frac{b\,c^3\,\left(1-c^2\,x^2\right)\,\left(d+e\,\text{Log}\left[1-c^2\,x^2\right]\right)}{10\,x^2}-$$
$$\frac{(a+b\,\text{ArcTanh}[c\,x])\,\left(d+e\,\text{Log}\left[1-c^2\,x^2\right]\right)}{5\,x^5}+\frac{1}{10}\,b\,c^5\,\left(d+e\,\text{Log}\left[1-c^2\,x^2\right]\right)\,\text{Log}\left[1-\frac{1}{1-c^2\,x^2}\right]-\frac{1}{10}\,b\,c^5\,e\,\text{PolyLog}\left[2,\frac{1}{1-c^2\,x^2}\right]$$

Result (type 8, 29 leaves):

$$\int\frac{(a+b\,\text{ArcTanh}[c\,x])\,\left(d+e\,\text{Log}\left[1-c^2\,x^2\right]\right)}{x^6}\,dx$$

Problem 533: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int x\,(a+b\,\text{ArcTanh}[c\,x])\,\left(d+e\,\text{Log}\left[f+g\,x^2\right]\right)\,dx$$

Optimal (type 4, 512 leaves, 22 steps):

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

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

$$\frac{b\,e\,x\,\text{Log}[f+g\,x^2]}{2\,c}-\frac{b\,e\,(c^2\,f+g)\,\text{ArcTanh}[c\,x]\,\text{Log}[f+g\,x^2]}{2\,c^2\,g}+\frac{e\,(f+g\,x^2)\,(a+b\,\text{ArcTanh}[c\,x])\,\text{Log}[f+g\,x^2]}{2\,g}+$$

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

Result (type 4, 1145 leaves):

$$\frac{1}{4\,c^2\,g}\left(2\,b\,c\,d\,g\,x-6\,b\,c\,e\,g\,x+2\,a\,c^2\,d\,g\,x^2-2\,a\,c^2\,e\,g\,x^2+4\,b\,c\,e\,\sqrt{f}\,\sqrt{g}\,\text{ArcTan}\left[\frac{\sqrt{g}\,x}{\sqrt{f}}\right]-2\,b\,d\,g\,\text{ArcTanh}[c\,x]+\right.$$

$$2\,b\,e\,g\,\text{ArcTanh}[c\,x]+2\,b\,c^2\,d\,g\,x^2\,\text{ArcTanh}[c\,x]-2\,b\,c^2\,e\,g\,x^2\,\text{ArcTanh}[c\,x]-4\,i\,b\,c^2\,e\,f\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f+g}}\right]\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]-$$

$$4\,i\,b\,e\,g\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f+g}}\right]\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]-4\,b\,c^2\,e\,f\,\text{ArcTanh}[c\,x]\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c\,x]}\right]-4\,b\,e\,g\,\text{ArcTanh}[c\,x]\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c\,x]}\right]-$$

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

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

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

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

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

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

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

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

$$2 b c e g x \text{Log}\left[f+g x^2\right]+2 a c^2 e g x^2 \text{Log}\left[f+g x^2\right]-2 b e g \text{ArcTanh}[c x] \text{Log}\left[f+g x^2\right]+2 b c^2 e g x^2 \text{ArcTanh}[c x] \text{Log}\left[f+g x^2\right]+$$

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

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

Problem 534: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \left(a+b \text{ArcTanh}[c x]\right) \left(d+e \text{Log}\left[f+g x^2\right]\right) dx$$

Optimal (type 4, 599 leaves, 28 steps):

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

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

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

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

Result (type 4, 1251 leaves):

$$a\,d\,x-2\,a\,e\,x+\frac{2\,a\,e\,\sqrt{f}\;\text{ArcTan}\left[\frac{\sqrt{g}\;x}{\sqrt{f}}\right]}{\sqrt{g}}+b\,d\,x\,\text{ArcTanh}[c\,x]+$$

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

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

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

$$\left.\frac{\text{Log}\left[\frac{1}{c}+x\right]\,\text{Log}\left[1-\frac{\sqrt{g}\,\left(\frac{1}{c}+x\right)}{i\,\sqrt{f}+\frac{\sqrt{g}}{c}}\right]+\text{PolyLog}\left[2,\frac{\sqrt{g}\,\left(\frac{1}{c}+x\right)}{i\,\sqrt{f}+\frac{\sqrt{g}}{c}}\right]}{2\,g}\right)-\frac{1}{2\,c}\,b\,e\left(4\,c\,x\,\text{ArcTanh}[c\,x]-4\,\text{Log}\left[\frac{1}{\sqrt{1-c^2\,x^2}}\right]+\right.$$

$$\frac{1}{g}\sqrt{c^2\,f\,g}\left(-2\,i\,\text{ArcCos}\left[\frac{-c^2\,f+g}{c^2\,f+g}\right]\,\text{ArcTan}\left[\frac{c\,g\,x}{\sqrt{c^2\,f\,g}}\right]+4\,\text{ArcTan}\left[\frac{\sqrt{c^2\,f\,g}}{c\,g\,x}\right]\,\text{ArcTanh}[c\,x]-\left(\text{ArcCos}\left[\frac{-c^2\,f+g}{c^2\,f+g}\right]-2\,\text{ArcTan}\left[\frac{c\,g\,x}{\sqrt{c^2\,f\,g}}\right]\right)\right.$$

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

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

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

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

Problem 536: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 613 leaves, 28 steps):

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

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

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

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

Result (type 4, 1226 leaves):

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

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

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

$$c\,\Bigg(\text{Log}\left[-\frac{1}{c}+x\right]\text{Log}\left[\frac{c\left(\sqrt{f}-i\sqrt{g}\,x\right)}{c\sqrt{f}-i\sqrt{g}}\right]+\text{Log}\left[\frac{1}{c}+x\right]\text{Log}\left[\frac{c\left(\sqrt{f}-i\sqrt{g}\,x\right)}{c\sqrt{f}+i\sqrt{g}}\right]+\text{Log}\left[-\frac{1}{c}+x\right]\text{Log}\left[\frac{c\left(\sqrt{f}+i\sqrt{g}\,x\right)}{c\sqrt{f}+i\sqrt{g}}\right]-$$

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

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

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

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

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

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

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

Problem 537: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 470 leaves, 20 steps):

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

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

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

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

Result (type 4, 1211 leaves):

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

$$4\,i\,b\,c^2\,e\,f\,x^2\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f+g}}\right]\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]+4\,i\,b\,e\,g\,x^2\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f+g}}\right]\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]+$$

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

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

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

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

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

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

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

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

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

$$2\,a\,e\,f\,\text{Log}\left[f+g\,x^2\right]-2\,b\,c\,e\,f\,x\,\text{Log}\left[f+g\,x^2\right]-2\,a\,e\,g\,x^2\,\text{Log}\left[f+g\,x^2\right]-2\,b\,e\,f\,\text{ArcTanh}[c\,x]\,\text{Log}\left[f+g\,x^2\right]+$$

$$2\,b\,c^2\,e\,f\,x^2\,\text{ArcTanh}[c\,x]\,\text{Log}\left[f+g\,x^2\right]-2\,b\,c^2\,e\,f\,x^2\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c\,x]}\right]-2\,b\,e\,g\,x^2\,\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c\,x]}\right]+$$

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

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

Test results for the 62 problems in "7.3.5 u (a+b arctanh(c+d x))^p.m"

Problem 2: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 204 leaves, 15 steps):

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

Result (type 4, 463 leaves):

$$-\frac{1}{12 b^3}\left(1-(a+b x)^2\right)^{3/2}\left(-\frac{a+b x}{\sqrt{1-(a+b x)^2}}+\frac{6 a (a+b x) \text{ArcTanh}[a+b x]}{\sqrt{1-(a+b x)^2}}+\frac{3 (a+b x) \text{ArcTanh}[a+b x]^2}{\sqrt{1-(a+b x)^2}}-\frac{3 a^2 (a+b x) \text{ArcTanh}[a+b x]^2}{\sqrt{1-(a+b x)^2}}+\text{ArcTanh}[a+b x]^2 \text{Cosh}[3 \text{ArcTanh}[a+b x]]+3 a^2 \text{ArcTanh}[a+b x]^2 \text{Cosh}[3 \text{ArcTanh}[a+b x]]+2 \text{ArcTanh}[a+b x] \text{Cosh}[3 \text{ArcTanh}[a+b x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[a+b x]}\right]+6 a^2 \text{ArcTanh}[a+b x] \text{Cosh}[3 \text{ArcTanh}[a+b x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[a+b x]}\right]-6 a \text{Cosh}[3 \text{ArcTanh}[a+b x]] \text{Log}\left[\frac{1}{\sqrt{1-(a+b x)^2}}\right]+\frac{1}{\sqrt{1-(a+b x)^2}}\left(3 \left(1-4 a+3 a^2\right) \text{ArcTanh}[a+b x]^2+2 \text{ArcTanh}[a+b x] \left(2+\left(3+9 a^2\right) \text{Log}\left[1+e^{-2 \text{ArcTanh}[a+b x]}\right]\right)-18 a \text{Log}\left[\frac{1}{\sqrt{1-(a+b x)^2}}\right]\right)-\frac{4 \left(1+3 a^2\right) \text{PolyLog}\left[2,-e^{-2 \text{ArcTanh}[a+b x]}\right]}{\left(1-(a+b x)^2\right)^{3/2}}-\text{Sinh}[3 \text{ArcTanh}[a+b x]]+6 a \text{ArcTanh}[a+b x] \text{Sinh}[3 \text{ArcTanh}[a+b x]]-\text{ArcTanh}[a+b x]^2 \text{Sinh}[3 \text{ArcTanh}[a+b x]]-3 a^2 \text{ArcTanh}[a+b x]^2 \text{Sinh}[3 \text{ArcTanh}[a+b x]]\right)$$

Problem 5: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 148 leaves, 2 steps):

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

Result (type 4, 634 leaves):

$$-\frac{4}{3}\text{ArcTanh}[a+b x]^3-\frac{2\,\text{ArcTanh}[a+b x]^3}{3 a}+\frac{2\sqrt{1-a^2}\;e^{\text{ArcTanh}[a]}\;\text{ArcTanh}[a+b x]^3}{3 a}-\text{ArcTanh}[a+b x]^2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[a+b x]}\right]-$$
$$i\,\pi\,\text{ArcTanh}[a+b x]\,\text{Log}\left[\frac{1}{2}\left(e^{-\text{ArcTanh}[a+b x]}+e^{\text{ArcTanh}[a+b x]}\right)\right]+\text{ArcTanh}[a+b x]^2\,\text{Log}\left[\frac{1}{2}e^{-\text{ArcTanh}[a+b x]}\left(1+a-e^{2\,\text{ArcTanh}[a+b x]}+a\,e^{2\,\text{ArcTanh}[a+b x]}\right)\right]-$$
$$\text{ArcTanh}[a+b x]^2\,\text{Log}\left[1+\frac{(-1+a)\,e^{2\,\text{ArcTanh}[a+b x]}}{1+a}\right]+\text{ArcTanh}[a+b x]^2\,\text{Log}\left[1-e^{-\text{ArcTanh}[a]+\text{ArcTanh}[a+b x]}\right]+$$
$$\text{ArcTanh}[a+b x]^2\,\text{Log}\left[1+e^{-\text{ArcTanh}[a]+\text{ArcTanh}[a+b x]}\right]-2\,\text{ArcTanh}[a]\,\text{ArcTanh}[a+b x]\,\text{Log}\left[\frac{1}{2}\,i\left(-e^{\text{ArcTanh}[a]-\text{ArcTanh}[a+b x]}+e^{-\text{ArcTanh}[a]+\text{ArcTanh}[a+b x]}\right)\right]+$$
$$\text{ArcTanh}[a+b x]^2\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[a]+2\,\text{ArcTanh}[a+b x]}\right]+i\,\pi\,\text{ArcTanh}[a+b x]\,\text{Log}\left[\frac{1}{\sqrt{1-(a+b x)^2}}\right]-$$
$$\text{ArcTanh}[a+b x]^2\,\text{Log}\left[-\frac{b x}{\sqrt{1-(a+b x)^2}}\right]+2\,\text{ArcTanh}[a]\,\text{ArcTanh}[a+b x]\,\text{Log}\left[-i\,\text{Sinh}[\text{ArcTanh}[a]-\text{ArcTanh}[a+b x]]\right]+$$
$$\text{ArcTanh}[a+b x]\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[a+b x]}\right]-\text{ArcTanh}[a+b x]\,\text{PolyLog}\left[2,-\frac{(-1+a)\,e^{2\,\text{ArcTanh}[a+b x]}}{1+a}\right]+$$
$$2\,\text{ArcTanh}[a+b x]\,\text{PolyLog}\left[2,-e^{-\text{ArcTanh}[a]+\text{ArcTanh}[a+b x]}\right]+2\,\text{ArcTanh}[a+b x]\,\text{PolyLog}\left[2,e^{-\text{ArcTanh}[a]+\text{ArcTanh}[a+b x]}\right]+$$
$$\text{ArcTanh}[a+b x]\,\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[a]+2\,\text{ArcTanh}[a+b x]}\right]+\frac{1}{2}\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}[a+b x]}\right]+\frac{1}{2}\text{PolyLog}\left[3,-\frac{(-1+a)\,e^{2\,\text{ArcTanh}[a+b x]}}{1+a}\right]-$$
$$2\,\text{PolyLog}\left[3,-e^{-\text{ArcTanh}[a]+\text{ArcTanh}[a+b x]}\right]-2\,\text{PolyLog}\left[3,e^{-\text{ArcTanh}[a]+\text{ArcTanh}[a+b x]}\right]-\frac{1}{2}\text{PolyLog}\left[3,e^{-2\,\text{ArcTanh}[a]+2\,\text{ArcTanh}[a+b x]}\right]$$

Problem 6: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 251 leaves, 17 steps):

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

Result (type 4, 208 leaves):

$$\frac{1}{a\left(-1+a^2\right)x}\left(-\left(-a+a^3+a^2 b x+b\left(-1+\sqrt{1-a^2}\ e^{\text{ArcTanh}[a]}\right)x\right)\text{ArcTanh}[a+b x]^2+a b x\,\text{ArcTanh}[a+b x]\right.$$
$$\left(-i\pi+2\,\text{ArcTanh}[a]-2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[a]-2\,\text{ArcTanh}[a+b x]}\right]\right)+a b x\left(i\pi\left(\text{Log}\left[1+e^{2\,\text{ArcTanh}[a+b x]}\right]-\text{Log}\left[\frac{1}{\sqrt{1-(a+b x)^2}}\right]\right)+2\,\text{ArcTanh}[a]\right.$$
$$\left.\left.\left(\text{Log}\left[1-e^{2\,\text{ArcTanh}[a]-2\,\text{ArcTanh}[a+b x]}\right]-\text{Log}[-i\,\text{Sinh}[\text{ArcTanh}[a]-\text{ArcTanh}[a+b x]]]\right)\right)+a b x\,\text{PolyLog}\left[2,\ e^{2\,\text{ArcTanh}[a]-2\,\text{ArcTanh}[a+b x]}\right]\right)$$

Problem 7: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}[a+b x]^2}{x^3}\,dx$$

Optimal (type 4, 370 leaves, 21 steps):

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

Result (type 4, 271 leaves):

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

Problem 12: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 54 leaves, 3 steps):

$$\frac{a \operatorname{Log}[c + d x]}{d e} - \frac{b \operatorname{PolyLog}[2, -c - d x]}{2 d e} + \frac{b \operatorname{PolyLog}[2, c + d x]}{2 d e}$$

Result (type 4, 288 leaves):

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

Problem 18: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 168 leaves, 8 steps):

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

Result (type 4, 424 leaves):

$$\frac{1}{d\,e}\left(a^2 \text{Log}[c+d\,x]+2\,a\,b\,\text{ArcTanh}[c+d\,x]\left(-\text{Log}\left[\frac{1}{\sqrt{1-(c+d\,x)^2}}\right]+\text{Log}\left[\frac{i\,(c+d\,x)}{\sqrt{1-(c+d\,x)^2}}\right]\right)-\right.$$
$$\frac{1}{4}\,a\,b\left(\pi^2-4\,i\,\pi\,\text{ArcTanh}[c+d\,x]-8\,\text{ArcTanh}[c+d\,x]^2-8\,\text{ArcTanh}[c+d\,x]\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+4\,i\,\pi\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[c+d\,x]}\right]+\right.$$
$$8\,\text{ArcTanh}[c+d\,x]\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[c+d\,x]}\right]-4\,i\,\pi\,\text{Log}\left[\frac{2}{\sqrt{1-(c+d\,x)^2}}\right]-8\,\text{ArcTanh}[c+d\,x]\,\text{Log}\left[\frac{2}{\sqrt{1-(c+d\,x)^2}}\right]+$$
$$\left.8\,\text{ArcTanh}[c+d\,x]\,\text{Log}\left[\frac{2\,i\,(c+d\,x)}{\sqrt{1-(c+d\,x)^2}}\right]+4\,\text{PolyLog}\left[2,e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+4\,\text{PolyLog}\left[2,-e^{2\,\text{ArcTanh}[c+d\,x]}\right]\right)+$$
$$b^2\left(\frac{i\,\pi^3}{24}-\frac{2}{3}\,\text{ArcTanh}[c+d\,x]^3-\text{ArcTanh}[c+d\,x]^2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+\text{ArcTanh}[c+d\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c+d\,x]}\right]+\right.$$
$$\text{ArcTanh}[c+d\,x]\,\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+\text{ArcTanh}[c+d\,x]\,\text{PolyLog}\left[2,e^{2\,\text{ArcTanh}[c+d\,x]}\right]+$$
$$\left.\left.\frac{1}{2}\,\text{PolyLog}\left[3,-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]-\frac{1}{2}\,\text{PolyLog}\left[3,e^{2\,\text{ArcTanh}[c+d\,x]}\right]\right)\right)$$

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

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

Optimal (type 4, 257 leaves, 10 steps):

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

Result (type 4, 599 leaves):

$$\frac{1}{64\,d\,e}\Bigg(64\,a^3\,\text{Log}[c+d\,x]+192\,a^2\,b\,\text{ArcTanh}[c+d\,x]\left(-\text{Log}\left[\frac{1}{\sqrt{1-(c+d\,x)^2}}\right]+\text{Log}\left[\frac{i\,(c+d\,x)}{\sqrt{1-(c+d\,x)^2}}\right]\right)-$$

$$96\,i\,a^2\,b\Bigg(-\frac{1}{4}\,i\,(\pi-2\,i\,\text{ArcTanh}[c+d\,x])^2+i\,\text{ArcTanh}[c+d\,x]^2+2\,i\,\text{ArcTanh}[c+d\,x]\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+$$

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

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

$$8\,a\,b^2\,\Big(i\,\pi^3-16\,\text{ArcTanh}[c+d\,x]^3-24\,\text{ArcTanh}[c+d\,x]^2\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+24\,\text{ArcTanh}[c+d\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c+d\,x]}\right]+$$
$$24\,\text{ArcTanh}[c+d\,x]\,\text{PolyLog}\left[2,\,-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+24\,\text{ArcTanh}[c+d\,x]\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcTanh}[c+d\,x]}\right]+$$
$$12\,\text{PolyLog}\left[3,\,-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]-12\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcTanh}[c+d\,x]}\right]\Big)+$$
$$b^3\,\Big(\pi^4-32\,\text{ArcTanh}[c+d\,x]^4-64\,\text{ArcTanh}[c+d\,x]^3\,\text{Log}\left[1+e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+64\,\text{ArcTanh}[c+d\,x]^3\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c+d\,x]}\right]+96\,\text{ArcTanh}[c+d\,x]^2$$
$$\text{PolyLog}\left[2,\,-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+96\,\text{ArcTanh}[c+d\,x]^2\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcTanh}[c+d\,x]}\right]+96\,\text{ArcTanh}[c+d\,x]\,\text{PolyLog}\left[3,\,-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]-$$
$$96\,\text{ArcTanh}[c+d\,x]\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcTanh}[c+d\,x]}\right]+48\,\text{PolyLog}\left[4,\,-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]+48\,\text{PolyLog}\left[4,\,e^{2\,\text{ArcTanh}[c+d\,x]}\right]\Big)\Bigg)$$

Problem 26: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 143 leaves, 7 steps):

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

Result (type 4, 248 leaves):

$$\frac{1}{2\,d\,e^2}\left(-\frac{2\,a^3}{c+d\,x}-\frac{6\,a^2\,b\,\text{ArcTanh}[c+d\,x]}{c+d\,x}+6\,a^2\,b\,\text{Log}[c+d\,x]-3\,a^2\,b\,\text{Log}\left[1-c^2-2\,c\,d\,x-d^2\,x^2\right]+\right.$$
$$6\,a\,b^2\left(\text{ArcTanh}[c+d\,x]\left(\left(1-\frac{1}{c+d\,x}\right)\text{ArcTanh}[c+d\,x]+2\,\text{Log}\left[1-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]\right)-\text{PolyLog}\left[2,\,e^{-2\,\text{ArcTanh}[c+d\,x]}\right]\right)+$$
$$2\,b^3\left(\frac{i\,\pi^3}{8}-\text{ArcTanh}[c+d\,x]^3-\frac{\text{ArcTanh}[c+d\,x]^3}{c+d\,x}+3\,\text{ArcTanh}[c+d\,x]^2\,\text{Log}\left[1-e^{2\,\text{ArcTanh}[c+d\,x]}\right]+\right.$$
$$\left.\left.3\,\text{ArcTanh}[c+d\,x]\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcTanh}[c+d\,x]}\right]-\frac{3}{2}\,\text{PolyLog}\left[3,\,e^{2\,\text{ArcTanh}[c+d\,x]}\right]\right)\right)$$

Problem 28: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 269 leaves, 16 steps):

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

Result (type 4, 393 leaves):

$$\frac{1}{6 d e^4}\left(-\frac{2 a^3}{(c+d x)^3}-\frac{3 a^2 b}{(c+d x)^2}-\frac{6 a^2 b \text{ArcTanh}[c+d x]}{(c+d x)^3}+6 a^2 b \text{Log}[c+d x]-3 a^2 b \text{Log}\left[1-c^2-2 c d x-d^2 x^2\right]+6 a b^2\left(-\frac{(c+d x)^2+\text{ArcTanh}[c+d x]^2}{(c+d x)^3}+\text{ArcTanh}[c+d x]\left(-\frac{1-(c+d x)^2}{(c+d x)^2}+\text{ArcTanh}[c+d x]+2 \text{Log}\left[1-e^{-2 \text{ArcTanh}[c+d x]}\right]\right)-\text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[c+d x]}\right]\right)+6 b^3\left(\frac{i \pi^3}{24}-\frac{\text{ArcTanh}[c+d x]}{c+d x}-\frac{\left(1-(c+d x)^2\right) \text{ArcTanh}[c+d x]^2}{2 (c+d x)^2}-\frac{1}{3} \text{ArcTanh}[c+d x]^3-\frac{\text{ArcTanh}[c+d x]^3}{3 (c+d x)}-\frac{\left(1-(c+d x)^2\right) \text{ArcTanh}[c+d x]^3}{3 (c+d x)^3}+\text{ArcTanh}[c+d x]^2 \text{Log}\left[1-e^{2 \text{ArcTanh}[c+d x]}\right]+\text{Log}\left[\frac{c+d x}{\sqrt{1-(c+d x)^2}}\right]+\text{ArcTanh}[c+d x] \text{PolyLog}\left[2, e^{2 \text{ArcTanh}[c+d x]}\right]-\frac{1}{2} \text{PolyLog}\left[3, e^{2 \text{ArcTanh}[c+d x]}\right]\right)\right)$$

Problem 29: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcTanh}[1+x]}{2+2 x} \, dx$$

Optimal (type 4, 21 leaves, 3 steps):

$$-\frac{1}{4} \text{PolyLog}[2,-1-x]+\frac{1}{4} \text{PolyLog}[2,1+x]$$

Result (type 4, 207 leaves):

$$\frac{1}{16}\left(-\pi^2+4 i \pi \text{ArcTanh}[1+x]+8 \text{ArcTanh}[1+x]^2+8 \text{ArcTanh}[1+x] \text{Log}\left[1-e^{-2 \text{ArcTanh}[1+x]}\right]-4 i \pi \text{Log}\left[1+e^{2 \text{ArcTanh}[1+x]}\right]-8 \text{ArcTanh}[1+x] \text{Log}\left[1+e^{2 \text{ArcTanh}[1+x]}\right]-8 \text{ArcTanh}[1+x] \text{Log}\left[\frac{1}{\sqrt{-x (2+x)}}\right]+4 i \pi \text{Log}\left[\frac{2}{\sqrt{-x (2+x)}}\right]+8 \text{ArcTanh}[1+x] \text{Log}\left[\frac{2}{\sqrt{-x (2+x)}}\right]+8 \text{ArcTanh}[1+x] \text{Log}\left[\frac{i (1+x)}{\sqrt{-x (2+x)}}\right]-8 \text{ArcTanh}[1+x] \text{Log}\left[\frac{2 i (1+x)}{\sqrt{-x (2+x)}}\right]-4 \text{PolyLog}\left[2, e^{-2 \text{ArcTanh}[1+x]}\right]-4 \text{PolyLog}\left[2,-e^{2 \text{ArcTanh}[1+x]}\right]\right)$$

Problem 30: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 32 leaves, 3 steps):

$$-\frac{\text{PolyLog}[2,-a-b x]}{2 d}+\frac{\text{PolyLog}[2,a+b x]}{2 d}$$

Result (type 4, 263 leaves):

$$-\frac{1}{8 d}\left(\pi^2-4 i \pi \text{ArcTanh}[a+b x]-8 \text{ArcTanh}[a+b x]^2-8 \text{ArcTanh}[a+b x] \text{Log}\left[1-e^{-2 \text{ArcTanh}[a+b x]}\right]+\right.$$
$$4 i \pi \text{Log}\left[1+e^{2 \text{ArcTanh}[a+b x]}\right]+8 \text{ArcTanh}[a+b x] \text{Log}\left[1+e^{2 \text{ArcTanh}[a+b x]}\right]+8 \text{ArcTanh}[a+b x] \text{Log}\left[\frac{1}{\sqrt{1-(a+b x)^2}}\right]-$$
$$4 i \pi \text{Log}\left[\frac{2}{\sqrt{1-(a+b x)^2}}\right]-8 \text{ArcTanh}[a+b x] \text{Log}\left[\frac{2}{\sqrt{1-(a+b x)^2}}\right]-8 \text{ArcTanh}[a+b x] \text{Log}\left[\frac{i (a+b x)}{\sqrt{1-(a+b x)^2}}\right]+$$
$$\left.8 \text{ArcTanh}[a+b x] \text{Log}\left[\frac{2 i (a+b x)}{\sqrt{1-(a+b x)^2}}\right]+4 \text{PolyLog}\left[2,e^{-2 \text{ArcTanh}[a+b x]}\right]+4 \text{PolyLog}\left[2,-e^{2 \text{ArcTanh}[a+b x]}\right]\right)$$

Problem 35: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 130 leaves, 5 steps):

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

Result (type 4, 329 leaves):

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

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

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

$$2\,i\left(\text{ArcTanh}\left[\frac{d\,e-c\,f}{f}\right]+\text{ArcTanh}[c+d\,x]\right)\text{Log}\left[2\,i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{d\,e-c\,f}{f}\right]+\text{ArcTanh}[c+d\,x]\right]\right]-$$

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

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

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

Optimal (type 4, 562 leaves, 20 steps):

$$\frac{b^2 f^2 (d\,e-c\,f)\,x}{d^3}+\frac{a\,b\,f\left(6\,d^2 e^2-12\,c\,d\,e\,f+\left(1+6\,c^2\right)f^2\right)x}{2\,d^3}+\frac{b^2 f^3 (c+d\,x)^2}{12\,d^4}-\frac{b^2 f^2 (d\,e-c\,f)\,\text{ArcTanh}[c+d\,x]}{d^4}+$$

$$\frac{b^2 f\left(6\,d^2 e^2-12\,c\,d\,e\,f+\left(1+6\,c^2\right)f^2\right)(c+d\,x)\,\text{ArcTanh}[c+d\,x]}{2\,d^4}+\frac{b\,f^2 (d\,e-c\,f)\,(c+d\,x)^2\,(a+b\,\text{ArcTanh}[c+d\,x])}{d^4}+$$

$$\frac{b\,f^3 (c+d\,x)^3\,(a+b\,\text{ArcTanh}[c+d\,x])}{6\,d^4}+\frac{(d\,e-c\,f)\left(d^2 e^2-2\,c\,d\,e\,f+\left(1+c^2\right)f^2\right)(a+b\,\text{ArcTanh}[c+d\,x])^2}{d^4}-$$

$$\frac{\left(d^4 e^4-4\,c\,d^3 e^3 f+6\left(1+c^2\right)d^2 e^2 f^2-4\,c\left(3+c^2\right)d\,e\,f^3+\left(1+6\,c^2+c^4\right)f^4\right)(a+b\,\text{ArcTanh}[c+d\,x])^2}{4\,d^4 f}+\frac{(e+f\,x)^4\,(a+b\,\text{ArcTanh}[c+d\,x])^2}{4\,f}-$$

$$\frac{2\,b\,(d\,e-c\,f)\left(d^2 e^2-2\,c\,d\,e\,f+\left(1+c^2\right)f^2\right)(a+b\,\text{ArcTanh}[c+d\,x])\,\text{Log}\left[\frac{2}{1-c-d\,x}\right]}{d^4}+\frac{b^2 f^3\,\text{Log}\left[1-(c+d\,x)^2\right]}{12\,d^4}+$$

$$\frac{b^2 f\left(6\,d^2 e^2-12\,c\,d\,e\,f+\left(1+6\,c^2\right)f^2\right)\text{Log}\left[1-(c+d\,x)^2\right]}{4\,d^4}-\frac{b^2 (d\,e-c\,f)\left(d^2 e^2-2\,c\,d\,e\,f+\left(1+c^2\right)f^2\right)\text{PolyLog}\left[2,-\frac{1+c+d\,x}{1-c-d\,x}\right]}{d^4}$$

Result (type 4, 1215 leaves):

$$a^2 e^3 x+\frac{3}{2}\,a^2 e^2 f\,x^2+a^2 e\,f^2 x^3+\frac{1}{4}\,a^2 f^3 x^4+$$

$$\frac{1}{12} a b \left(6 x \left(4 e^3+6 e^2 f x+4 e f^2 x^2+f^3 x^3\right) \text{ArcTanh}[c+d x]-\frac{1}{d^4}\left(-2 d f x \left(3 \left(1+3 c^2\right) f^2-3 c d f (8 e+f x)+d^2 \left(18 e^2+6 e f x+f^2 x^2\right)\right)+\right.\right.$$

$$3 (-1+c) \left(4 d^3 e^3-6 (-1+c) d^2 e^2 f+4 (-1+c)^2 d e f^2-(-1+c)^3 f^3\right) \text{Log}[1-c-d x]+$$

$$\left.\left.3 (1+c) \left(-4 d^3 e^3+6 (1+c) d^2 e^2 f-4 (1+c)^2 d e f^2+(1+c)^3 f^3\right) \text{Log}[1+c+d x]\right)\right)+\frac{1}{d}$$

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

$$\frac{1}{2 d^2}$$

$$3 b^2 e^2 f \left(\left(1-(c+d x)^2\right) \text{ArcTanh}[c+d x]^2+2 \left(-(c+d x) \text{ArcTanh}[c+d x]-c \text{ArcTanh}[c+d x]^2+c (c+d x) \text{ArcTanh}[c+d x]^2-\right.\right.$$

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

$$\frac{1}{12 d^4} b^2 f^3 \left(3 \left(1-(c+d x)^2\right)^2 \text{ArcTanh}[c+d x]^2-\left(1-(c+d x)^2\right) \left(1-12 c \text{ArcTanh}[c+d x]+6 \text{ArcTanh}[c+d x]^2+18 c^2 \text{ArcTanh}[c+d x]^2-\right.\right.$$

$$\left.2 (c+d x) \text{ArcTanh}[c+d x] (-1+6 c \text{ArcTanh}[c+d x])\right)-4 \left(-3 c \text{ArcTanh}[c+d x]^2-3 c^3 \text{ArcTanh}[c+d x]^2+\right.$$

$$(c+d x) \left(-2 \text{ArcTanh}[c+d x]-9 c^2 \text{ArcTanh}[c+d x]+3 c^3 \text{ArcTanh}[c+d x]^2+3 c \left(1+\text{ArcTanh}[c+d x]^2\right)\right)-6 c \left(1+c^2\right) \text{ArcTanh}[c+d x]$$

$$\left.\left.\text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]+2 \text{Log}\left[\frac{1}{\sqrt{1-(c+d x)^2}}\right]+9 c^2 \text{Log}\left[\frac{1}{\sqrt{1-(c+d x)^2}}\right]\right)-12 \left(c+c^3\right) \text{PolyLog}\left[2,-e^{-2 \text{ArcTanh}[c+d x]}\right]\right)-$$

$$\frac{1}{4 d^3} b^2 e f^2 \left(1-(c+d x)^2\right)^{3/2} \left(-\frac{c+d x}{\sqrt{1-(c+d x)^2}}+\frac{6 c (c+d x) \text{ArcTanh}[c+d x]}{\sqrt{1-(c+d x)^2}}+\frac{3 (c+d x) \text{ArcTanh}[c+d x]^2}{\sqrt{1-(c+d x)^2}}-\right.$$

$$\frac{3 c^2 (c+d x) \text{ArcTanh}[c+d x]^2}{\sqrt{1-(c+d x)^2}}+\text{ArcTanh}[c+d x]^2 \text{Cosh}[3 \text{ArcTanh}[c+d x]]+3 c^2 \text{ArcTanh}[c+d x]^2 \text{Cosh}[3 \text{ArcTanh}[c+d x]]+$$

$$2 \text{ArcTanh}[c+d x] \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]+6 c^2 \text{ArcTanh}[c+d x] \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]-$$

$$6 c \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[\frac{1}{\sqrt{1-(c+d x)^2}}\right]+\frac{1}{\sqrt{1-(c+d x)^2}}\left(\text{ArcTanh}[c+d x] \left(4+3 \left(1-4 c+3 c^2\right) \text{ArcTanh}[c+d x]\right)+\right.$$

$$\left.6 \left(\text{ArcTanh}[c+d x]+3 c^2 \text{ArcTanh}[c+d x]\right) \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]-18 c \text{Log}\left[\frac{1}{\sqrt{1-(c+d x)^2}}\right]\right)-$$

$$\frac{4\left(1+3c^2\right)\text{PolyLog}\left[2,-e^{-2\,\text{ArcTanh}[c+d x]}\right]}{\left(1-(c+d x)^2\right)^{3/2}}-\text{Sinh}[3\,\text{ArcTanh}[c+d x]]+6\,c\,\text{ArcTanh}[c+d x]\,\text{Sinh}[3\,\text{ArcTanh}[c+d x]]-$$

$$\left.\text{ArcTanh}[c+d x]^2\,\text{Sinh}[3\,\text{ArcTanh}[c+d x]]-3\,c^2\,\text{ArcTanh}[c+d x]^2\,\text{Sinh}[3\,\text{ArcTanh}[c+d x]]\right)$$

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

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

Optimal (type 4, 374 leaves, 16 steps):

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

$$\frac{(d e-c f)\left(d^2 e^2-2 c d e f+\left(3+c^2\right) f^2\right)(a+b\,\text{ArcTanh}[c+d x])^2}{3 d^3 f}+\frac{\left(3 d^2 e^2-6 c d e f+\left(1+3 c^2\right) f^2\right)(a+b\,\text{ArcTanh}[c+d x])^2}{3 d^3}+$$

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

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

Result (type 4, 795 leaves):

$$a^2 e^2 x + a^2 e f x^2 + \frac{1}{3} a^2 f^2 x^3 +$$

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

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

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

$$\frac{1}{12 d^3} b^2 f^2 \left(1 - \left(c + d x\right)^2\right)^{3/2} \left(-\frac{c + d x}{\sqrt{1 - \left(c + d x\right)^2}} + \frac{6 c \left(c + d x\right) \text{ArcTanh}[c + d x]}{\sqrt{1 - \left(c + d x\right)^2}} + \frac{3 \left(c + d x\right) \text{ArcTanh}[c + d x]^2}{\sqrt{1 - \left(c + d x\right)^2}} - \frac{3 c^2 \left(c + d x\right) \text{ArcTanh}[c + d x]^2}{\sqrt{1 - \left(c + d x\right)^2}} + \text{ArcTanh}[c + d x]^2 \text{Cosh}[3 \text{ArcTanh}[c + d x]] + 3 c^2 \text{ArcTanh}[c + d x]^2 \text{Cosh}[3 \text{ArcTanh}[c + d x]] + 2 \text{ArcTanh}[c + d x] \text{Cosh}[3 \text{ArcTanh}[c + d x]] \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c+d x]}\right] + 6 c^2 \text{ArcTanh}[c + d x] \text{Cosh}[3 \text{ArcTanh}[c + d x]] \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c+d x]}\right] - 6 c \text{Cosh}[3 \text{ArcTanh}[c + d x]] \text{Log}\left[\frac{1}{\sqrt{1 - \left(c + d x\right)^2}}\right] + \frac{1}{\sqrt{1 - \left(c + d x\right)^2}} \left(3 \left(1 - 4 c + 3 c^2\right) \text{ArcTanh}[c + d x]^2 + 2 \text{ArcTanh}[c + d x] \left(2 + \left(3 + 9 c^2\right) \text{Log}\left[1 + e^{-2 \text{ArcTanh}[c+d x]}\right]\right) - 18 c \text{Log}\left[\frac{1}{\sqrt{1 - \left(c + d x\right)^2}}\right]\right) - \frac{4 \left(1 + 3 c^2\right) \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[c+d x]}\right]}{\left(1 - \left(c + d x\right)^2\right)^{3/2}} - \text{Sinh}[3 \text{ArcTanh}[c + d x]] + 6 c \text{ArcTanh}[c + d x] \text{Sinh}[3 \text{ArcTanh}[c + d x]] - \text{ArcTanh}[c + d x]^2 \text{Sinh}[3 \text{ArcTanh}[c + d x]] - 3 c^2 \text{ArcTanh}[c + d x]^2 \text{Sinh}[3 \text{ArcTanh}[c + d x]]\right)$$

Problem 42: Unable to integrate problem.

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

Optimal (type 4, 214 leaves, 2 steps):

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

Result (type 8, 22 leaves):

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

Problem 43: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 480 leaves, 24 steps):

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

Result (type 4, 1198 leaves):

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

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

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

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

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

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

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

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

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

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

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

$$\left.\left.\left.\left.\text{Log}\left[i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{d\,e-c\,f}{f}\right]+\text{ArcTanh}[c+d\,x]\right]\right]\right)+(d\,e-c\,f)\,\text{PolyLog}\left[2,e^{-2\left(\text{ArcTanh}\left[\frac{d\,e-c\,f}{f}\right]+\text{ArcTanh}[c+d\,x]\right)}\right]\right)\right)\right)$$

Problem 44: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 750 leaves, 26 steps):

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

Result (type 4, 1970 leaves):

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

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

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

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

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

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

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

$$\left((d\,e-c\,f)\,(d\,e-f-c\,f)\,(d\,e+f-c\,f)\,\left(-f^2+(d\,e-c\,f)^2\right)\,(d\,e-c\,f+f\,(c+d\,x))^3\right)-$$

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

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

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

$$\left.\left.\left.\frac{d e-c f}{f}\right]\operatorname{Log}\left[i \operatorname{Sinh}\left[\operatorname{ArcTanh}\left[\frac{d e-c f}{f}\right]+\operatorname{ArcTanh}[c+d x]\right]\right]+i \operatorname{PolyLog}\left[2, e^{2 i\left(i \operatorname{ArcTanh}\left[\frac{d e-c f}{f}\right]+i \operatorname{ArcTanh}[c+d x]\right)}\right]\right)\right)\right) \Big/$$

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

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

$$\left(-e^{-\operatorname{ArcTanh}\left[\frac{d e-c f}{f}\right]} \operatorname{ArcTanh}[c+d x]^2+\frac{1}{f \sqrt{1-\frac{(d e-c f)^2}{f^2}}}\, i\,(d e-c f)\left(-\left(-\pi+2 i \operatorname{ArcTanh}\left[\frac{d e-c f}{f}\right]\right) \operatorname{ArcTanh}[c+d x]-2\left(i \operatorname{ArcTanh}\left[\right.\right.\right.\right.$$

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

$$\left.\left.\left.2 i \operatorname{ArcTanh}\left[\frac{d e-c f}{f}\right] \operatorname{Log}\left[i \operatorname{Sinh}\left[\operatorname{ArcTanh}\left[\frac{d e-c f}{f}\right]+\operatorname{ArcTanh}[c+d x]\right]\right]+i \operatorname{PolyLog}\left[2, e^{2 i\left(i \operatorname{ArcTanh}\left[\frac{d e-c f}{f}\right]+i \operatorname{ArcTanh}[c+d x]\right)}\right]\right)\right)\right) \Big/$$

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

Problem 45: Result more than twice size of optimal antiderivative.

$$\int (e+f x)^2 (a+b \operatorname{ArcTanh}[c+d x])^3 \, dx$$

Optimal (type 4, 546 leaves, 21 steps):

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

Result (type 4, 1868 leaves):

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

$$\frac{1}{4 d^3} a b^2 f^2 \left(1-(c+d x)^2\right)^{3/2} \left(-\frac{c+d x}{\sqrt{1-(c+d x)^2}}+\frac{6 c (c+d x) \text{ArcTanh}[c+d x]}{\sqrt{1-(c+d x)^2}}+\frac{3 (c+d x) \text{ArcTanh}[c+d x]^2}{\sqrt{1-(c+d x)^2}}-\right.$$

$$\frac{3 c^2 (c+d x) \text{ArcTanh}[c+d x]^2}{\sqrt{1-(c+d x)^2}}+\text{ArcTanh}[c+d x]^2 \text{Cosh}[3 \text{ArcTanh}[c+d x]]+3 c^2 \text{ArcTanh}[c+d x]^2 \text{Cosh}[3 \text{ArcTanh}[c+d x]]+$$

$$2 \text{ArcTanh}[c+d x] \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]+6 c^2 \text{ArcTanh}[c+d x] \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]-$$

$$6 c \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[\frac{1}{\sqrt{1-(c+d x)^2}}\right]+\frac{1}{\sqrt{1-(c+d x)^2}}\left(\text{ArcTanh}[c+d x] \left(4+3 \left(1-4 c+3 c^2\right) \text{ArcTanh}[c+d x]\right)+\right.$$

$$\left.6 \left(\text{ArcTanh}[c+d x]+3 c^2 \text{ArcTanh}[c+d x]\right) \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]-18 c \text{Log}\left[\frac{1}{\sqrt{1-(c+d x)^2}}\right]\right)-$$

$$\frac{4 \left(1+3 c^2\right) \text{PolyLog}\left[2,-e^{-2 \text{ArcTanh}[c+d x]}\right]}{\left(1-(c+d x)^2\right)^{3/2}}-\text{Sinh}[3 \text{ArcTanh}[c+d x]]+6 c \text{ArcTanh}[c+d x] \text{Sinh}[3 \text{ArcTanh}[c+d x]]-$$

$$\left.\text{ArcTanh}[c+d x]^2 \text{Sinh}[3 \text{ArcTanh}[c+d x]]-3 c^2 \text{ArcTanh}[c+d x]^2 \text{Sinh}[3 \text{ArcTanh}[c+d x]]\right)+$$

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

$$\frac{1}{12} \left(1-(c+d x)^2\right)^{3/2} \left(-\frac{3 (c+d x) \text{ArcTanh}[c+d x]}{\sqrt{1-(c+d x)^2}}+\frac{9 c (c+d x) \text{ArcTanh}[c+d x]^2}{\sqrt{1-(c+d x)^2}}+\frac{3 (c+d x) \text{ArcTanh}[c+d x]^3}{\sqrt{1-(c+d x)^2}}-\right.$$

$$\frac{3 c^2 (c+d x) \text{ArcTanh}[c+d x]^3}{\sqrt{1-(c+d x)^2}}-9 c \text{ArcTanh}[c+d x]^2 \text{Cosh}[3 \text{ArcTanh}[c+d x]]+\text{ArcTanh}[c+d x]^3 \text{Cosh}[3 \text{ArcTanh}[c+d x]]+$$

$$3 c^2 \text{ArcTanh}[c+d x]^3 \text{Cosh}[3 \text{ArcTanh}[c+d x]]-18 c \text{ArcTanh}[c+d x] \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]+$$
$$3 \text{ArcTanh}[c+d x]^2 \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]+$$

$$9 c^2 \text{ArcTanh}[c+d x]^2 \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[1+e^{-2 \text{ArcTanh}[c+d x]}\right]+3 \text{Cosh}[3 \text{ArcTanh}[c+d x]] \text{Log}\left[\frac{1}{\sqrt{1-(c+d x)^2}}\right]+$$

$$\frac{1}{\sqrt{1-(c+d x)^2}} 3 \left(\text{ArcTanh}[c+d x]^2 \left(2-9 c+\text{ArcTanh}[c+d x]-4 c \text{ArcTanh}[c+d x]+3 c^2 \text{ArcTanh}[c+d x]\right)+\right.$$

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

$$\frac{6\,(1+3\,c^2)\,\text{PolyLog}\left[3,\,-e^{-2\,\text{ArcTanh}[c+d\,x]}\right]}{\left(1-(c+d\,x)^2\right)^{3/2}}-3\,\text{ArcTanh}[c+d\,x]\,\text{Sinh}[3\,\text{ArcTanh}[c+d\,x]]+9\,c\,\text{ArcTanh}[c+d\,x]^2\,\text{Sinh}[3\,\text{ArcTanh}[c+d\,x]]-$$

$$\text{ArcTanh}[c+d\,x]^3\,\text{Sinh}[3\,\text{ArcTanh}[c+d\,x]]-3\,c^2\,\text{ArcTanh}[c+d\,x]^3\,\text{Sinh}[3\,\text{ArcTanh}[c+d\,x]]\Bigg)\Bigg)$$

Problem 48: Unable to integrate problem.

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

Optimal (type 4, 308 leaves, 2 steps):

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

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

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

Result (type 8, 22 leaves):

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

Problem 49: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 1089 leaves, 33 steps):

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

Result (type 1, 1 leaves):

???

Problem 52: Unable to integrate problem.

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

Optimal (type 5, 162 leaves, 6 steps):

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

Result (type 8, 20 leaves):

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

Problem 53: Result is not expressed in closed-form.

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

Optimal (type 4, 780 leaves, 23 steps):

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

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

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

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

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

Result (type 7, 881 leaves):

$$\frac{1}{6} b^2 \,\text{RootSum}\Big[b^3 c - d - 3 a d - 3 a^2 d - a^3 d + 3 b^3 c \,\#1 + 3 d \,\#1 + 3 a d \,\#1 - 3 a^2 d \,\#1 -$$
$$3 a^3 d \,\#1 + 3 b^3 c \,\#1^2 - 3 d \,\#1^2 + 3 a d \,\#1^2 + 3 a^2 d \,\#1^2 - 3 a^3 d \,\#1^2 + b^3 c \,\#1^3 + d \,\#1^3 - 3 a d \,\#1^3 + 3 a^2 d \,\#1^3 - a^3 d \,\#1^3 \,\&,$$
$$\Big(i \pi \,\text{ArcTanh}[a + b x] + 2 \,\text{ArcTanh}[a + b x]^2 + 2 \,\text{ArcTanh}[a + b x] \,\text{ArcTanh}\Big[\frac{1 - \#1}{1 + \#1}\Big] - i \pi \,\text{Log}\Big[1 + e^{2 \,\text{ArcTanh}[a+b x]}\Big] +$$
$$2 \,\text{ArcTanh}[a + b x] \,\text{Log}\Big[1 - e^{-2 \left(\text{ArcTanh}[a+b x] + \text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\right)}\Big] + 2 \,\text{ArcTanh}\Big[\frac{1 - \#1}{1 + \#1}\Big] \,\text{Log}\Big[1 - e^{-2 \left(\text{ArcTanh}[a+b x] + \text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\right)}\Big] +$$
$$i \pi \,\text{Log}\Big[\frac{1}{\sqrt{1 - (a + b x)^2}}\Big] - 2 \,\text{ArcTanh}\Big[\frac{1 - \#1}{1 + \#1}\Big] \,\text{Log}\Big[i \,\text{Sinh}\Big[\text{ArcTanh}[a + b x] + \text{ArcTanh}\Big[\frac{1 - \#1}{1 + \#1}\Big]\Big]\Big] - \text{PolyLog}\Big[2, e^{-2 \left(\text{ArcTanh}[a+b x] + \text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\right)}\Big] +$$
$$2 \,\text{ArcTanh}[a + b x]^2 \,\#1 - i \pi \,\text{ArcTanh}[a + b x] \,\#1^2 - 2 \,\text{ArcTanh}[a + b x] \,\text{ArcTanh}\Big[\frac{1 - \#1}{1 + \#1}\Big] \,\#1^2 + i \pi \,\text{Log}\Big[1 + e^{2 \,\text{ArcTanh}[a+b x]}\Big] \,\#1^2 -$$
$$2 \,\text{ArcTanh}[a + b x] \,\text{Log}\Big[1 - e^{-2 \left(\text{ArcTanh}[a+b x] + \text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\right)}\Big] \,\#1^2 - 2 \,\text{ArcTanh}\Big[\frac{1 - \#1}{1 + \#1}\Big] \,\text{Log}\Big[1 - e^{-2 \left(\text{ArcTanh}[a+b x] + \text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\right)}\Big] \,\#1^2 -$$
$$i \pi \,\text{Log}\Big[\frac{1}{\sqrt{1 - (a + b x)^2}}\Big] \,\#1^2 + 2 \,\text{ArcTanh}\Big[\frac{1 - \#1}{1 + \#1}\Big] \,\text{Log}\Big[i \,\text{Sinh}\Big[\text{ArcTanh}[a + b x] + \text{ArcTanh}\Big[\frac{1 - \#1}{1 + \#1}\Big]\Big]\Big] \,\#1^2 +$$
$$\text{PolyLog}\Big[2, e^{-2 \left(\text{ArcTanh}[a+b x] + \text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\right)}\Big] \,\#1^2 - 2 \,e^{-\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]} \,\text{ArcTanh}[a + b x]^2 \sqrt{\frac{\#1}{(1 + \#1)^2}} -$$
$$4 \,e^{-\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]} \,\text{ArcTanh}[a + b x]^2 \,\#1 \sqrt{\frac{\#1}{(1 + \#1)^2}} - 2 \,e^{-\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]} \,\text{ArcTanh}[a + b x]^2 \,\#1^2 \sqrt{\frac{\#1}{(1 + \#1)^2}}\Big) \Big/$$
$$\left(b^3 c - a d - 2 a^2 d - a^3 d + 2 b^3 c \,\#1 + 2 a d \,\#1 - 2 a^3 d \,\#1 + b^3 c \,\#1^2 - a d \,\#1^2 + 2 a^2 d \,\#1^2 - a^3 d \,\#1^2\right) \,\&\Big]$$

Problem 54: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 481 leaves, 17 steps):

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

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

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

Result (type 4, 1419 leaves) :

$$\frac{1}{4\left(1-a^2\right)\sqrt{c}\,d}$$

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

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

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

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

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

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

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

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

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

Problem 55: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 120 leaves, 5 steps):

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

Result (type 4, 304 leaves):

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

Problem 56: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 186 leaves, 15 steps):

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

Result (type 4, 759 leaves):

$$
\begin{aligned}
&\frac{1}{2 b c^2 (-a c + b d)} \Big(-2 a^2 c^2 \text{ArcTanh}[a+b x] + 2 a b c d \text{ArcTanh}[a+b x] + i a b c d \pi \text{ArcTanh}[a+b x] - i b^2 d^2 \pi \text{ArcTanh}[a+b x] - 2 a b c^2 x \text{ArcTanh}[a+b x] + \\
&2 b^2 c d x \text{ArcTanh}[a+b x] - 2 a b c d \text{ArcTanh}\left[a - \frac{b d}{c}\right] \text{ArcTanh}[a+b x] + 2 b^2 d^2 \text{ArcTanh}\left[a - \frac{b d}{c}\right] \text{ArcTanh}[a+b x] - b c d \text{ArcTanh}[a+b x]^2 - \\
&a b c d \text{ArcTanh}[a+b x]^2 + b^2 d^2 \text{ArcTanh}[a+b x]^2 + b c d \sqrt{1 - a^2 + \frac{2 a b d}{c} - \frac{b^2 d^2}{c^2}}\, e^{\text{ArcTanh}\left[a - \frac{b d}{c}\right]} \text{ArcTanh}[a+b x]^2 - \\
&2 a b c d \text{ArcTanh}\left[a - \frac{b d}{c}\right] \text{Log}\left[1 - e^{2 \left(\text{ArcTanh}\left[a - \frac{b d}{c}\right] - \text{ArcTanh}[a+b x]\right)}\right] + 2 b^2 d^2 \text{ArcTanh}\left[a - \frac{b d}{c}\right] \text{Log}\left[1 - e^{2 \left(\text{ArcTanh}\left[a - \frac{b d}{c}\right] - \text{ArcTanh}[a+b x]\right)}\right] + \\
&2 a b c d \text{ArcTanh}[a+b x] \text{Log}\left[1 - e^{2 \left(\text{ArcTanh}\left[a - \frac{b d}{c}\right] - \text{ArcTanh}[a+b x]\right)}\right] - 2 b^2 d^2 \text{ArcTanh}[a+b x] \text{Log}\left[1 - e^{2 \left(\text{ArcTanh}\left[a - \frac{b d}{c}\right] - \text{ArcTanh}[a+b x]\right)}\right] - \\
&2 a b c d \text{ArcTanh}[a+b x] \text{Log}\left[1 + e^{-2 \text{ArcTanh}[a+b x]}\right] + 2 b^2 d^2 \text{ArcTanh}[a+b x] \text{Log}\left[1 + e^{-2 \text{ArcTanh}[a+b x]}\right] - i a b c d \pi \text{Log}\left[1 + e^{2 \text{ArcTanh}[a+b x]}\right] + \\
&i b^2 d^2 \pi \text{Log}\left[1 + e^{2 \text{ArcTanh}[a+b x]}\right] + 2 a c^2 \text{Log}\left[\frac{1}{\sqrt{1 - (a+b x)^2}}\right] - 2 b c d \text{Log}\left[\frac{1}{\sqrt{1 - (a+b x)^2}}\right] + i a b c d \pi \text{Log}\left[\frac{1}{\sqrt{1 - (a+b x)^2}}\right] - \\
&i b^2 d^2 \pi \text{Log}\left[\frac{1}{\sqrt{1 - (a+b x)^2}}\right] + 2 a b c d \text{ArcTanh}\left[a - \frac{b d}{c}\right] \text{Log}\left[-i \text{Sinh}\left[\text{ArcTanh}\left[a - \frac{b d}{c}\right] - \text{ArcTanh}[a+b x]\right]\right] - \\
&2 b^2 d^2 \text{ArcTanh}\left[a - \frac{b d}{c}\right] \text{Log}\left[-i \text{Sinh}\left[\text{ArcTanh}\left[a - \frac{b d}{c}\right] - \text{ArcTanh}[a+b x]\right]\right] + \\
&b d (-a c + b d) \text{PolyLog}\left[2, e^{2 \left(\text{ArcTanh}\left[a - \frac{b d}{c}\right] - \text{ArcTanh}[a+b x]\right)}\right] + b d (a c - b d) \text{PolyLog}\left[2, -e^{-2 \text{ArcTanh}[a+b x]}\right] \Big)
\end{aligned}
$$

Problem 57: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 545 leaves, 25 steps):

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

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

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

Result (type 4, 1458 leaves) :

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 58: Result is not expressed in closed-form.

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

Optimal (type 4, 832 leaves, 31 steps):

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

Result (type 7, 917 leaves):

$$-\frac{1}{6\,b\,c}\Bigg(-6\,(a+b\,x)\,\text{ArcTanh}[a+b\,x]+6\,\text{Log}\left[\frac{1}{\sqrt{1-(a+b\,x)^2}}\right]+b^3\,d\,\text{RootSum}\Big[c+3\,a\,c+3\,a^2\,c+a^3\,c-b^3\,d-3\,c\,\#1-3\,a\,c\,\#1+3\,a^2\,c\,\#1+3\,a^3\,c\,\#1-3\,b^3\,d\,\#1+$$

$$3\,c\,\#1^2-3\,a\,c\,\#1^2-3\,a^2\,c\,\#1^2+3\,a^3\,c\,\#1^2-3\,b^3\,d\,\#1^2-c\,\#1^3+3\,a\,c\,\#1^3-3\,a^2\,c\,\#1^3+a^3\,c\,\#1^3-b^3\,d\,\#1^3\,\&,$$

$$\Bigg(-i\,\pi\,\text{ArcTanh}[a+b\,x]-2\,\text{ArcTanh}[a+b\,x]^2-2\,\text{ArcTanh}[a+b\,x]\,\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]+i\,\pi\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[a+b\,x]}\right]-2\,\text{ArcTanh}[a+b\,x]$$

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

$$2\,\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\,\text{Log}\left[i\,\text{Sinh}\left[\text{ArcTanh}[a+b\,x]+\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\right]\right]+\text{PolyLog}\left[2,\,e^{-2\left(\text{ArcTanh}[a+b\,x]+\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\right)}\right]-$$

$$2\,\text{ArcTanh}[a+b\,x]^2\,\#1+i\,\pi\,\text{ArcTanh}[a+b\,x]\,\#1^2+2\,\text{ArcTanh}[a+b\,x]\,\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]\,\#1^2-i\,\pi\,\text{Log}\left[1+e^{2\,\text{ArcTanh}[a+b\,x]}\right]\,\#1^2+$$

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

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

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

$$4\,e^{-\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]}\,\text{ArcTanh}[a+b\,x]^2\,\#1\,\sqrt{\frac{\#1}{(1+\#1)^2}}+2\,e^{-\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]}\,\text{ArcTanh}[a+b\,x]^2\,\#1^2\,\sqrt{\frac{\#1}{(1+\#1)^2}}\Bigg)\Big/$$

$$\left(a\,c+2\,a^2\,c+a^3\,c-b^3\,d-2\,a\,c\,\#1+2\,a^3\,c\,\#1-2\,b^3\,d\,\#1+a\,c\,\#1^2-2\,a^2\,c\,\#1^2+a^3\,c\,\#1^2-b^3\,d\,\#1^2\right)\,\&\Big]\Bigg)$$

Problem 59: Unable to integrate problem.

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

Optimal (type 4, 585 leaves, 31 steps):

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

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

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

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

Result (type 8, 20 leaves):

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

Problem 60: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 661 leaves, 37 steps):

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

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

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

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

Result (type 1, 1 leaves):

???

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

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

Optimal (type 4, 335 leaves, 12 steps):

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

Result (type 4, 8801 leaves):

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

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

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

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

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

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

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

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

$$\mathrm{Log}\left[1-e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]+\pi\,\mathrm{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4ac}}-\frac{2cd}{\sqrt{b^2-4ac}\;e}+\frac{2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right)^2}}\right]+$$

$$2\,i\,\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\mathrm{Log}\left[i\,\mathrm{Sinh}\left[\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right]\right]+$$

$$\left.\left.i\,\mathrm{PolyLog}\left[2,\,e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]\right)\right)-$$

$$\frac{1}{(b^2-4ac)\,e^2\,(2c-2cd+be)\sqrt{\frac{(b^2-4ac)e^2-(2c(-1+d)-be)^2}{(b^2-4ac)e^2}}}\,4c^3 d\left(-e^{-\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]}\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]^2+\right.$$

$$\frac{1}{\sqrt{b^2-4ac}\;e\sqrt{1-\frac{(2c(-1+d)-be)^2}{(b^2-4ac)e^2}}}\,i\,(2c(-1+d)-be)\left(-\left(-\pi+2\,i\,\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\right)\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]-\right.$$

$$\pi\,\mathrm{Log}\left[1+e^{2\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]}\right]-2\left(i\,\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+i\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)$$

$$\mathrm{Log}\left[1-e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]+\pi\,\mathrm{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4ac}}-\frac{2cd}{\sqrt{b^2-4ac}\;e}+\frac{2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right)^2}}\right]+$$

$$2\,i\,\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\mathrm{Log}\left[i\,\mathrm{Sinh}\left[\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right]\right]+$$

$$i\,\mathrm{PolyLog}\left[2, e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(-1+d)-b e}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]\Bigg)\Bigg) + \frac{1}{(b^2-4ac)\,e^2\,(2c-2cd+be)\sqrt{\frac{(b^2-4ac)e^2-(2c(-1+d)-be)^2}{(b^2-4ac)e^2}}}$$

$$2c^3d^2\left(-e^{-\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]}\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]^2 + \frac{1}{\sqrt{b^2-4ac}\;e\sqrt{1-\frac{(2c(-1+d)-be)^2}{(b^2-4ac)e^2}}}\,i\,(2c(-1+d)-be)\right.$$

$$\Bigg(-\left(-\pi+2\,i\,\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\right)\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right] - \pi\,\mathrm{Log}\left[1+e^{2\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]}\right] -$$

$$2\left(i\,\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+i\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)\mathrm{Log}\left[1-e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right] +$$

$$\pi\,\mathrm{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4ac}}-\frac{2cd}{\sqrt{b^2-4ac}\;e}+\frac{2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right)^2}}\right] + 2\,i\,\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\mathrm{Log}\left[i\,\mathrm{Sinh}\left[\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right] +\right.\right.$$

$$\left.\left.\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right]\right] + i\,\mathrm{PolyLog}\left[2, e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(-1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]\Bigg)\Bigg) +$$

$$\frac{1}{\left(b^2-4ac\right) e \left(2c-2cd+be\right) \sqrt{\frac{\left(b^2-4ac\right) e^2-\left(2c\left(-1+d\right)-be\right)^2}{\left(b^2-4ac\right) e^2}}} 2bc^2 \left(-e^{-\text{ArcTanh}\left[\frac{2c\left(-1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]} \text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]^2+\right.$$

$$\frac{1}{\sqrt{b^2-4ac}\,e\sqrt{1-\frac{\left(2c\left(-1+d\right)-be\right)^2}{\left(b^2-4ac\right)e^2}}} i \left(2c\left(-1+d\right)-be\right) \left(-\left(-\pi+2 i \text{ArcTanh}\left[\frac{2c\left(-1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]\right) \text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]-\right.$$

$$\pi \text{Log}\left[1+e^{2\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]}\right]-2\left(i \text{ArcTanh}\left[\frac{2c\left(-1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]+i \text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]\right)$$

$$\text{Log}\left[1-e^{-2\left(\text{ArcTanh}\left[\frac{2c\left(-1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]\right)}\right]+\pi \text{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4ac}}-\frac{2cd}{\sqrt{b^2-4ac}\,e}+\frac{2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right)^2}}\right]+$$

$$2 i \text{ArcTanh}\left[\frac{2c\left(-1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right] \text{Log}\left[i \text{Sinh}\left[\text{ArcTanh}\left[\frac{2c\left(-1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]\right]\right]+$$

$$\left.\left. i \text{PolyLog}\left[2, e^{-2\left(\text{ArcTanh}\left[\frac{2c\left(-1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]\right)}\right]\right)\right)-$$

$$\frac{1}{\left(b^2-4ac\right) e \left(2c-2cd+be\right) \sqrt{\frac{\left(b^2-4ac\right) e^2-\left(2c\left(-1+d\right)-be\right)^2}{\left(b^2-4ac\right) e^2}}} 2bc^2 d \left(-e^{-\text{ArcTanh}\left[\frac{2c\left(-1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]} \text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]^2+\right.$$

$$\frac{1}{\sqrt{b^2-4\,a\,c}\;e\sqrt{1-\frac{(2\,c\,(-1+d)-b\,e)^2}{(b^2-4\,a\,c)\,e^2}}}\;\mathbb{i}\,(2\,c\,(-1+d)-b\,e)\,\Bigg(-\left(-\pi+2\,\mathbb{i}\,\text{ArcTanh}\left[\frac{2\,c\,(-1+d)-b\,e}{\sqrt{b^2-4\,a\,c}\;e}\right]\right)\text{ArcTanh}\left[\frac{-2\,c\,d+b\,e+2\,c\,(d+e\,x)}{\sqrt{b^2-4\,a\,c}\;e}\right]-$$

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

$$\text{Log}\left[1-\mathbb{e}^{-2\left(\text{ArcTanh}\left[\frac{2\,c\,(-1+d)-b\,e}{\sqrt{b^2-4\,a\,c}\;e}\right]+\text{ArcTanh}\left[\frac{-2\,c\,d+b\,e+2\,c\,(d+e\,x)}{\sqrt{b^2-4\,a\,c}\;e}\right]\right)}\right]+\pi\,\text{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4\,a\,c}}-\frac{2\,c\,d}{\sqrt{b^2-4\,a\,c}\;e}+\frac{2\,c\,(d+e\,x)}{\sqrt{b^2-4\,a\,c}\;e}\right)^2}}\right]+$$

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

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

$$\frac{1}{(b^2-4\,a\,c)\,(-2\,c-2\,c\,d+b\,e)\sqrt{\frac{(b^2-4\,a\,c)\,e^2-(2\,c\,(1+d)-b\,e)^2}{(b^2-4\,a\,c)\,e^2}}}\;2\,a\,c^2\,\Bigg(-\mathbb{e}^{-\text{ArcTanh}\left[\frac{2\,c\,(1+d)-b\,e}{\sqrt{b^2-4\,a\,c}\;e}\right]}\,\text{ArcTanh}\left[\frac{-2\,c\,d+b\,e+2\,c\,(d+e\,x)}{\sqrt{b^2-4\,a\,c}\;e}\right]^2+$$

$$\frac{1}{\sqrt{b^2-4\,a\,c}\;e\sqrt{1-\frac{(2\,c\,(1+d)-b\,e)^2}{(b^2-4\,a\,c)\,e^2}}}\;\mathbb{i}\,(2\,c\,(1+d)-b\,e)\,\Bigg(-\left(-\pi+2\,\mathbb{i}\,\text{ArcTanh}\left[\frac{2\,c\,(1+d)-b\,e}{\sqrt{b^2-4\,a\,c}\;e}\right]\right)\text{ArcTanh}\left[\frac{-2\,c\,d+b\,e+2\,c\,(d+e\,x)}{\sqrt{b^2-4\,a\,c}\;e}\right]-$$

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

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

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

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

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

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

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

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

$$2\,\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\mathrm{Log}\left[\mathrm{i}\,\mathrm{Sinh}\left[\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right]\right]+$$

$$\left.\left.\mathrm{i}\,\mathrm{PolyLog}\left[2,\mathrm{e}^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]\right)\right)-$$

$$\frac{1}{(b^2-4ac)\,e^2\,(-2c-2cd+be)\sqrt{\frac{(b^2-4ac)e^2-(2c(1+d)-be)^2}{(b^2-4ac)e^2}}}\,4c^3d\left(-\mathrm{e}^{-\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]}\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]^2+\right.$$

$$\frac{1}{\sqrt{b^2-4ac}\;e\sqrt{1-\frac{(2c(1+d)-be)^2}{(b^2-4ac)e^2}}}\,\mathrm{i}\,(2c(1+d)-be)\left(-\left(-\pi+2\,\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\right)\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]-\right.$$

$$\pi\,\mathrm{Log}\left[1+\mathrm{e}^{2\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]}\right]-2\left(\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)$$

$$\mathrm{Log}\left[1-\mathrm{e}^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]+\pi\,\mathrm{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4ac}}-\frac{2cd}{\sqrt{b^2-4ac}\;e}+\frac{2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right)^2}}\right]+$$

$$2\,\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\mathrm{Log}\left[\mathrm{i}\,\mathrm{Sinh}\left[\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right]\right]+$$

$$\left.\left.\mathrm{i}\,\mathrm{PolyLog}\left[2,\ e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(1+d)-b e}{\sqrt{b^2-4ac}\ e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right]\right)}\right]\right)\right)-$$

$$\frac{1}{\left(b^2-4ac\right)e^2\left(-2c-2cd+be\right)\sqrt{\frac{\left(b^2-4ac\right)e^2-(2c(1+d)-be)^2}{\left(b^2-4ac\right)e^2}}}\,2c^3d^2\left(-e^{-\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\ e}\right]}\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right]^2+\right.$$

$$\frac{1}{\sqrt{b^2-4ac}\ e\sqrt{1-\frac{(2c(1+d)-be)^2}{\left(b^2-4ac\right)e^2}}}\,\mathrm{i}\left(2c(1+d)-be\right)\left(-\left(-\pi+2\,\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\ e}\right]\right)\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right]-\right.$$

$$\pi\,\mathrm{Log}\left[1+e^{2\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right]}\right]-2\left(\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\ e}\right]+\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right]\right)$$

$$\mathrm{Log}\left[1-e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\ e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right]\right)}\right]+\pi\,\mathrm{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4ac}}-\frac{2cd}{\sqrt{b^2-4ac}\ e}+\frac{2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right)^2}}\right]+$$

$$2\,\mathrm{i}\,\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\ e}\right]\mathrm{Log}\left[\mathrm{i}\,\mathrm{Sinh}\left[\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\ e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right]\right]\right]+$$

$$\left.\left.\mathrm{i}\,\mathrm{PolyLog}\left[2,\ e^{-2\left(\mathrm{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\ e}\right]+\mathrm{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\ e}\right]\right)}\right]\right)\right)+$$

$$\frac{1}{\left(b^2-4ac\right)e\left(-2c-2cd+be\right)\sqrt{\frac{\left(b^2-4ac\right)e^2-\left(2c\left(1+d\right)-be\right)^2}{\left(b^2-4ac\right)e^2}}}2bc^2\left(-e^{-\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\,e}\right]}\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]^2+\right.$$

$$\frac{1}{\sqrt{b^2-4ac}\,e\sqrt{1-\frac{(2c(1+d)-be)^2}{\left(b^2-4ac\right)e^2}}}\,\mathrm{i}\left(2c\left(1+d\right)-be\right)\left(-\left(-\pi+2\,\mathrm{i}\,\text{ArcTanh}\left[\frac{2c\left(1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]\right)\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]-\right.$$

$$\pi\,\text{Log}\left[1+e^{2\,\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\,e}\right]}\right]-2\left(\mathrm{i}\,\text{ArcTanh}\left[\frac{2c\left(1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]+\mathrm{i}\,\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]\right)$$

$$\text{Log}\left[1-e^{-2\left(\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\,e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\,e}\right]\right)}\right]+\pi\,\text{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4ac}}-\frac{2cd}{\sqrt{b^2-4ac}\,e}+\frac{2c(d+ex)}{\sqrt{b^2-4ac}\,e}\right)^2}}\right]+$$

$$2\,\mathrm{i}\,\text{ArcTanh}\left[\frac{2c\left(1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]\text{Log}\left[\mathrm{i}\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{2c\left(1+d\right)-be}{\sqrt{b^2-4ac}\,e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]\right]\right]+$$

$$\left.\left.\mathrm{i}\,\text{PolyLog}\left[2,e^{-2\left(\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\,e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\,e}\right]\right)}\right]\right)\right)+$$

$$\frac{1}{\left(b^2-4ac\right)e\left(-2c-2cd+be\right)\sqrt{\frac{\left(b^2-4ac\right)e^2-\left(2c\left(1+d\right)-be\right)^2}{\left(b^2-4ac\right)e^2}}}2bc^2d\left(-e^{-\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\,e}\right]}\text{ArcTanh}\left[\frac{-2cd+be+2c\left(d+ex\right)}{\sqrt{b^2-4ac}\,e}\right]^2+\right.$$

$$\frac{1}{\sqrt{b^2-4ac}\; e\,\sqrt{1-\frac{(2c(1+d)-be)^2}{(b^2-4ac)\,e^2}}}\,i\,(2c(1+d)-be)\left(-\left(-\pi+2\,i\,\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\right)\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]-\right.$$

$$\pi\,\text{Log}\left[1+e^{2\,\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]}\right]-2\left(i\,\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+i\,\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)$$

$$\text{Log}\left[1-e^{-2\left(\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]+\pi\,\text{Log}\left[\frac{1}{\sqrt{1-\left(\frac{b}{\sqrt{b^2-4ac}}-\frac{2cd}{\sqrt{b^2-4ac}\;e}+\frac{2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right)^2}}\right]+$$

$$2\,i\,\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]\text{Log}\left[i\,\text{Sinh}\left[\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right]\right]+$$

$$\left.i\,\text{PolyLog}\left[2,\,e^{-2\left(\text{ArcTanh}\left[\frac{2c(1+d)-be}{\sqrt{b^2-4ac}\;e}\right]+\text{ArcTanh}\left[\frac{-2cd+be+2c(d+ex)}{\sqrt{b^2-4ac}\;e}\right]\right)}\right]\right)\Bigg)\Bigg)\Bigg)$$

Test results for the 1378 problems in "7.3.6 Exponentials of inverse hyperbolic tangent functions.m"

Problem 15: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{2\,\text{ArcTanh}[a\,x]}}{x}\,dx$$

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

$\text{Log}[x]-2\,\text{Log}[1-a\,x]$

Result (type 3, 25 leaves):

$\text{Log}\left[1-e^{2\,\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1+e^{2\,\text{ArcTanh}[a\,x]}\right]$

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

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{x}\,dx$$

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

$$\text{Log}[x]-2\,\text{Log}[1+a\,x]$$

Result (type 3, 25 leaves):

$$\text{Log}\left[1-e^{-2\,\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1+e^{-2\,\text{ArcTanh}[a\,x]}\right]$$

Problem 60: Unable to integrate problem.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{4},-\frac{1}{4},2+m,a\,x,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 61: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 282 leaves, 15 steps):

$$-\frac{3\,(1-a\,x)^{3/4}\,(1+a\,x)^{1/4}}{8\,a^3}-\frac{(1-a\,x)^{3/4}\,(1+a\,x)^{5/4}}{12\,a^3}-\frac{x\,(1-a\,x)^{3/4}\,(1+a\,x)^{5/4}}{3\,a^2}+$$
$$\frac{3\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-\frac{3\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}+\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 93 leaves):

$$-\frac{-\frac{8 e^{\frac{1}{2}\text{ArcTanh}[a x]}\left(9+6 e^{2\text{ArcTanh}[a x]}+29 e^{4\text{ArcTanh}[a x]}\right)}{\left(1+e^{2\text{ArcTanh}[a x]}\right)^3}-9\,\text{RootSum}\left[1+\#1^4\&,\frac{\text{ArcTanh}[a x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\&\right]}{96 a^3}$$

Problem 62: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a x]}\,x\,dx$$

Optimal (type 3, 255 leaves, 14 steps):

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

Result (type 7, 83 leaves):

$$-\frac{-\frac{8 e^{\frac{1}{2}\text{ArcTanh}[a x]}\left(1+5 e^{2\text{ArcTanh}[a x]}\right)}{\left(1+e^{2\text{ArcTanh}[a x]}\right)^2}+\text{RootSum}\left[1+\#1^4\&,\frac{-\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\&\right]}{16 a^2}$$

Problem 63: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a x]}\,dx$$

Optimal (type 3, 222 leaves, 13 steps):

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

Result (type 7, 71 leaves):

$$-\frac{-\frac{8 e^{\frac{1}{2}\text{ArcTanh}[a x]}}{1+e^{2\text{ArcTanh}[a x]}}+\text{RootSum}\left[1+\#1^4\&,\frac{-\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\&\right]}{4 a}$$

Problem 64: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a x]}}{x}\,dx$$

Optimal (type 3, 227 leaves, 17 steps):

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

Result (type 7, 87 leaves):

$$-2\,\text{ArcTan}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]-\text{Log}\left[1+e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{-\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 70: Unable to integrate problem.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,\frac{3}{4},\,-\frac{3}{4},\,2+m,\,a x,\,-a x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{\frac{3}{2}\text{ArcTanh}[a x]}\,x^m\,dx$$

Problem 71: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a x]}\,x^3\,dx$$

Optimal (type 3, 290 leaves, 15 steps):

$$-\frac{41\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{64\,a^4}-\frac{x^2\,(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}}{4\,a^2}-\frac{(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}\,(11+4\,a\,x)}{32\,a^4}+$$
$$\frac{123\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}-\frac{123\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{123\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}-\frac{123\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}$$

Result (type 7, 103 leaves):

$$\frac{1}{256\,a^4}\left(-\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(41+183\,e^{2\,\text{ArcTanh}[a\,x]}+147\,e^{4\,\text{ArcTanh}[a\,x]}+133\,e^{6\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4}-123\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 72: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 282 leaves, 15 steps):

$$-\frac{17\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{24\,a^3}-\frac{(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}}{4\,a^3}-\frac{x\,(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}}{3\,a^2}+\frac{17\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-$$
$$\frac{17\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}+\frac{17\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}-\frac{17\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 93 leaves):

$$\frac{-\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(17+30\,e^{2\,\text{ArcTanh}[a\,x]}+45\,e^{4\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^3}-51\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{96\,a^3}$$

Problem 73: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,x\,dx$$

Optimal (type 3, 255 leaves, 14 steps):

$$-\frac{3\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{4\,a^2}-\frac{(1-a\,x)^{1/4}\,(1+a\,x)^{7/4}}{2\,a^2}+\frac{9\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\,\sqrt{2}\,a^2}-$$
$$\frac{9\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{4\,\sqrt{2}\,a^2}+\frac{9\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^2}-\frac{9\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^2}$$

Result (type 7, 84 leaves):

$$\frac{-\frac{e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,\left(3+7\,e^{2\,\text{ArcTanh}[a\,x]}\right)}{2\,\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2}-\frac{9}{16}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{a^2}$$

Problem 74: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,dx$$

Optimal (type 3, 223 leaves, 13 steps):

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

Result (type 7, 72 leaves):

$$-\frac{2\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}}{a\,\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)}-\frac{3\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{4\,a}$$

Problem 75: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{3}{2}\text{ArcTanh}[a\,x]}}{x}\,dx$$

Optimal (type 3, 227 leaves, 17 steps):

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

Result (type 7, 87 leaves):

$$2\,\text{ArcTan}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1-e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]-\text{Log}\left[1+e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{-\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]$$

Problem 80: Unable to integrate problem.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,\frac{5}{4},\,-\frac{5}{4},\,2+m,\,a\,x,\,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 81: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^3\,dx$$

Optimal (type 3, 317 leaves, 16 steps):

$$\frac{475\,(1-a\,x)^{3/4}\,(1+a\,x)^{1/4}}{64\,a^4}+\frac{4\,x^3\,(1+a\,x)^{5/4}}{a\,(1-a\,x)^{1/4}}+\frac{17\,x^2\,(1-a\,x)^{3/4}\,(1+a\,x)^{5/4}}{4\,a^2}+\frac{(1-a\,x)^{3/4}\,(1+a\,x)^{5/4}\,(521+452\,a\,x)}{96\,a^4}-$$
$$\frac{475\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{475\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{475\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}-\frac{475\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}$$

Result (type 7, 114 leaves):

$$\frac{1}{a^4}\left(\frac{e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(1425+5415\,e^{2\,\text{ArcTanh}[a\,x]}+7483\,e^{4\,\text{ArcTanh}[a\,x]}+4645\,e^{6\,\text{ArcTanh}[a\,x]}+768\,e^{8\,\text{ArcTanh}[a\,x]}\right)}{96\,\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4}+\right.$$
$$\left.\frac{475}{256}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 82: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a x]} x^2 \, dx$$

Optimal (type 3, 305 leaves, 16 steps):

$$\frac{55 (1-a x)^{3/4} (1+a x)^{1/4}}{8 a^3}+\frac{11 (1-a x)^{3/4} (1+a x)^{5/4}}{4 a^3}+\frac{2 (1+a x)^{9/4}}{a^3 (1-a x)^{1/4}}+\frac{(1-a x)^{3/4} (1+a x)^{9/4}}{3 a^3}-$$
$$\frac{55 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^3}+\frac{55 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^3}+\frac{55 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16 \sqrt{2} a^3}-\frac{55 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16 \sqrt{2} a^3}$$

Result (type 7, 104 leaves):

$$\frac{1}{a^3}\left(\frac{e^{\frac{1}{2}\text{ArcTanh}[a x]} \left(165+462 e^{2 \text{ArcTanh}[a x]}+425 e^{4 \text{ArcTanh}[a x]}+96 e^{6 \text{ArcTanh}[a x]}\right)}{12 \left(1+e^{2 \text{ArcTanh}[a x]}\right)^3}+\frac{55}{32} \text{RootSum}\left[1+\#1^4 \&, \frac{\text{ArcTanh}[a x]-2 \text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3} \&\right]\right)$$

Problem 83: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a x]} x \, dx$$

Optimal (type 3, 279 leaves, 15 steps):

$$\frac{25 (1-a x)^{3/4} (1+a x)^{1/4}}{4 a^2}+\frac{5 (1-a x)^{3/4} (1+a x)^{5/4}}{2 a^2}+\frac{2 (1+a x)^{9/4}}{a^2 (1-a x)^{1/4}}-\frac{25 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4 \sqrt{2} a^2}+$$
$$\frac{25 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4 \sqrt{2} a^2}+\frac{25 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^2}-\frac{25 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^2}$$

Result (type 7, 94 leaves):

$$\frac{\frac{e^{\frac{1}{2}\text{ArcTanh}[a x]} \left(25+45 e^{2 \text{ArcTanh}[a x]}+16 e^{4 \text{ArcTanh}[a x]}\right)}{2 \left(1+e^{2 \text{ArcTanh}[a x]}\right)^2}+\frac{25}{16} \text{RootSum}\left[1+\#1^4 \&, \frac{\text{ArcTanh}[a x]-2 \text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3} \&\right]}{a^2}$$

Problem 84: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\text{ArcTanh}[a x]} \, dx$$

Optimal (type 3, 247 leaves, 14 steps):

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

Result (type 7, 83 leaves):

$$\frac{\frac{8\,e^{\frac{1}{2}\text{ArcTanh}[a x]}\left(5+4\,e^{2\,\text{ArcTanh}[a x]}\right)}{1+e^{2\,\text{ArcTanh}[a x]}}+5\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]}{4\,a}$$

Problem 85: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{5}{2}\text{ArcTanh}[a x]}}{x}\,dx$$

Optimal (type 3, 248 leaves, 19 steps):

$$\frac{8\,(1+a x)^{1/4}}{(1-a x)^{1/4}}-2\,\text{ArcTan}\left[\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]-2\,\text{ArcTanh}\left[\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]+\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 97 leaves):

$$8\,e^{\frac{1}{2}\text{ArcTanh}[a x]}-2\,\text{ArcTan}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]-\text{Log}\left[1+e^{\frac{1}{2}\text{ArcTanh}[a x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 90: Unable to integrate problem.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,-\frac{1}{4},\frac{1}{4},2+m,a\,x,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 91: Result is not expressed in closed-form.

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

Optimal (type 3, 290 leaves, 15 steps):

$$-\frac{11\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{64\,a^4}-\frac{x^2\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{4\,a^2}-\frac{(25-4\,a\,x)\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{96\,a^4}-\frac{11\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{11\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}-\frac{11\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}+\frac{11\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}$$

Result (type 7, 103 leaves):

$$\frac{1}{768\,a^4}\left(-\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\,\left(245+107\,e^{2\,\text{ArcTanh}[a\,x]}+279\,e^{4\,\text{ArcTanh}[a\,x]}+33\,e^{6\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4}+33\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 92: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 282 leaves, 15 steps):

$$\frac{3\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{8\,a^3}+\frac{(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{12\,a^3}-\frac{x\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{3\,a^2}+\frac{3\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-\frac{3\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}+\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}-\frac{3\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 93 leaves):

$$\frac{\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(29+6\,e^{2\,\text{ArcTanh}[a\,x]}+9\,e^{4\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^3}-9\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]}{96\,a^3}$$

Problem 93: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\,x\,dx$$

Optimal (type 3, 255 leaves, 14 steps):

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

Result (type 7, 79 leaves):

$$\frac{-\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(5+e^{2\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2}+\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]}{16\,a^2}$$

Problem 94: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\,dx$$

Optimal (type 3, 221 leaves, 13 steps):

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

Result (type 7, 69 leaves):

$$-\frac{-\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}}{1+e^{2\,\text{ArcTanh}[a\,x]}}+\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]}{4\,a}$$

Problem 95: Result is not expressed in closed-form.

$$\int \frac{e^{-\frac{1}{2}\text{ArcTanh}[a x]}}{x}\,dx$$

Optimal (type 3, 227 leaves, 17 steps):

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

Result (type 7, 85 leaves):

$$-2\,\text{ArcTan}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]-\text{Log}\left[1+e^{-\frac{1}{2}\text{ArcTanh}[a x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 100: Unable to integrate problem.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,-\frac{3}{4},\,\frac{3}{4},\,2+m,\,a x,\,-a x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a x]}\,x^m\,dx$$

Problem 101: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a x]}\,x^3\,dx$$

Optimal (type 3, 290 leaves, 15 steps):

$$-\frac{41\,(1-a\,x)^{3/4}\,(1+a\,x)^{1/4}}{64\,a^4}-\frac{x^2\,(1-a\,x)^{7/4}\,(1+a\,x)^{1/4}}{4\,a^2}-\frac{(11-4\,a\,x)\,(1-a\,x)^{7/4}\,(1+a\,x)^{1/4}}{32\,a^4}-\frac{123\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{123\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{123\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}-\frac{123\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}$$

Result (type 7, 103 leaves):

$$\frac{1}{256\,a^4}\left(-\frac{8\,e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(133+147\,e^{2\,\text{ArcTanh}[a\,x]}+183\,e^{4\,\text{ArcTanh}[a\,x]}+41\,e^{6\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4}+123\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]\right)$$

Problem 102: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 282 leaves, 15 steps):

$$\frac{17\,(1-a\,x)^{3/4}\,(1+a\,x)^{1/4}}{24\,a^3}+\frac{(1-a\,x)^{7/4}\,(1+a\,x)^{1/4}}{4\,a^3}-\frac{x\,(1-a\,x)^{7/4}\,(1+a\,x)^{1/4}}{3\,a^2}+\frac{17\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-\frac{17\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-\frac{17\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}+\frac{17\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 93 leaves):

$$\frac{\frac{8\,e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(45+30\,e^{2\,\text{ArcTanh}[a\,x]}+17\,e^{4\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^3}-51\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{96\,a^3}$$

Problem 103: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a\,x]}\,x\,dx$$

Optimal (type 3, 255 leaves, 14 steps):

$$-\frac{3(1-ax)^{3/4}(1+ax)^{1/4}}{4a^2}-\frac{(1-ax)^{7/4}(1+ax)^{1/4}}{2a^2}-\frac{9\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{4\sqrt{2}\,a^2}+$$
$$\frac{9\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{4\sqrt{2}\,a^2}+\frac{9\,\text{Log}\left[1+\frac{\sqrt{1-ax}}{\sqrt{1+ax}}-\frac{\sqrt{2}\,(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{8\sqrt{2}\,a^2}-\frac{9\,\text{Log}\left[1+\frac{\sqrt{1-ax}}{\sqrt{1+ax}}+\frac{\sqrt{2}\,(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{8\sqrt{2}\,a^2}$$

Result (type 7, 84 leaves):

$$\frac{-\frac{e^{\frac{1}{2}\text{ArcTanh}[a x]}\left(7+3\,e^{2\,\text{ArcTanh}[a x]}\right)}{2\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^2}+\frac{9}{16}\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]}{a^2}$$

Problem 104: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\text{ArcTanh}[a x]}\,dx$$

Optimal (type 3, 222 leaves, 13 steps):

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

Result (type 7, 72 leaves):

$$\frac{2\,e^{-\frac{3}{2}\text{ArcTanh}[a x]}}{a\left(1+e^{-2\,\text{ArcTanh}[a x]}\right)}-\frac{3\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]}{4a}$$

Problem 105: Result is not expressed in closed-form.

$$\int \frac{e^{-\frac{3}{2}\text{ArcTanh}[a x]}}{x}\,dx$$

Optimal (type 3, 227 leaves, 17 steps):

$$-2\,\text{ArcTan}\left[\frac{(1+ax)^{1/4}}{(1-ax)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]-$$
$$2\,\text{ArcTanh}\left[\frac{(1+ax)^{1/4}}{(1-ax)^{1/4}}\right]+\frac{\text{Log}\left[1+\frac{\sqrt{1-ax}}{\sqrt{1+ax}}-\frac{\sqrt{2}\,(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-ax}}{\sqrt{1+ax}}+\frac{\sqrt{2}\,(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 85 leaves):

$$2\,\text{ArcTan}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1-e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]-\text{Log}\left[1+e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]$$

Problem 110: Unable to integrate problem.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,-\frac{5}{4},\,\frac{5}{4},\,2+m,\,a\,x,\,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Problem 111: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a\,x]}\,x^3\,dx$$

Optimal (type 3, 317 leaves, 16 steps):

$$-\frac{4\,x^3\,(1-a\,x)^{5/4}}{a\,(1+a\,x)^{1/4}}+\frac{475\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{64\,a^4}+\frac{17\,x^2\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{4\,a^2}+\frac{(521-452\,a\,x)\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{96\,a^4}+$$

$$\frac{475\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}-\frac{475\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\,\sqrt{2}\,a^4}+\frac{475\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}-\frac{475\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\,\sqrt{2}\,a^4}$$

Result (type 7, 114 leaves):

$$\frac{1}{a^4}\left(\frac{e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\left(768+4645\,e^{2\,\text{ArcTanh}[a\,x]}+7483\,e^{4\,\text{ArcTanh}[a\,x]}+5415\,e^{6\,\text{ArcTanh}[a\,x]}+1425\,e^{8\,\text{ArcTanh}[a\,x]}\right)}{96\,\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4}-\right.$$

$$\left.\frac{475}{256}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 112: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a x]} x^2 \, dx$$

Optimal (type 3, 305 leaves, 16 steps):

$$-\frac{2 (1-a x)^{9/4}}{a^3 (1+a x)^{1/4}}-\frac{55 (1-a x)^{1/4} (1+a x)^{3/4}}{8 a^3}-\frac{11 (1-a x)^{5/4} (1+a x)^{3/4}}{4 a^3}-\frac{(1-a x)^{9/4} (1+a x)^{3/4}}{3 a^3}-\frac{55 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^3}+\frac{55 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^3}-\frac{55 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16 \sqrt{2} a^3}+\frac{55 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{16 \sqrt{2} a^3}$$

Result (type 7, 104 leaves):

$$\frac{1}{a^3}\left(-\frac{e^{-\frac{1}{2}\text{ArcTanh}[a x]} \left(96+425 e^{2 \text{ArcTanh}[a x]}+462 e^{4 \text{ArcTanh}[a x]}+165 e^{6 \text{ArcTanh}[a x]}\right)}{12 \left(1+e^{2 \text{ArcTanh}[a x]}\right)^3}+\frac{55}{32} \text{RootSum}\left[1+\#1^4 \&, \frac{\text{ArcTanh}[a x]+2 \text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3} \&\right]\right)$$

Problem 113: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a x]} x \, dx$$

Optimal (type 3, 279 leaves, 15 steps):

$$\frac{2 (1-a x)^{9/4}}{a^2 (1+a x)^{1/4}}+\frac{25 (1-a x)^{1/4} (1+a x)^{3/4}}{4 a^2}+\frac{5 (1-a x)^{5/4} (1+a x)^{3/4}}{2 a^2}+\frac{25 \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4 \sqrt{2} a^2}-\frac{25 \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{4 \sqrt{2} a^2}+\frac{25 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^2}-\frac{25 \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{8 \sqrt{2} a^2}$$

Result (type 7, 94 leaves):

$$\frac{\frac{e^{-\frac{1}{2}\text{ArcTanh}[a x]} \left(16+45 e^{2 \text{ArcTanh}[a x]}+25 e^{4 \text{ArcTanh}[a x]}\right)}{2 \left(1+e^{2 \text{ArcTanh}[a x]}\right)^2}-\frac{25}{16} \text{RootSum}\left[1+\#1^4 \&, \frac{\text{ArcTanh}[a x]+2 \text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3} \&\right]}{a^2}$$

Problem 114: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\text{ArcTanh}[a x]} \, dx$$

Optimal (type 3, 247 leaves, 14 steps):

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

Result (type 7, 83 leaves):

$$\frac{-\frac{8\,e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\left(4+5\,e^{2\,\text{ArcTanh}[a\,x]}\right)}{1+e^{2\,\text{ArcTanh}[a\,x]}}+5\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTanh}[a\,x]+2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]}{4\,a}$$

Problem 115: Result is not expressed in closed-form.

$$\int \frac{e^{-\frac{5}{2}\text{ArcTanh}[a\,x]}}{x}\,dx$$

Optimal (type 3, 248 leaves, 19 steps):

$$\frac{8\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}+2\,\text{ArcTan}\left[\frac{(1+a\,x)^{1/4}}{(1-a\,x)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]-\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]-2\,\text{ArcTanh}\left[\frac{(1+a\,x)^{1/4}}{(1-a\,x)^{1/4}}\right]+\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 99 leaves):

$$8\,e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-2\,\text{ArcTan}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\text{Log}\left[1-e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]-\text{Log}\left[1+e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}\right]+\frac{1}{2}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{-\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{-\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 120: Unable to integrate problem.

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,x^m\,dx$$

Optimal (type 6, 28 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{6},-\frac{1}{6},2+m,x,-x\right]}{1+m}$$

Result (type 8, 14 leaves):

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,x^m\,dx$$

Problem 121: Result is not expressed in closed-form.

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,x^2\,dx$$

Optimal (type 3, 245 leaves, 16 steps):

$$-\frac{19}{54}(1-x)^{5/6}(1+x)^{1/6}-\frac{1}{18}(1-x)^{5/6}(1+x)^{7/6}-\frac{1}{3}(1-x)^{5/6}x(1+x)^{7/6}-\frac{19}{81}\text{ArcTan}\left[\frac{(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\frac{19}{162}\text{ArcTan}\left[\sqrt{3}-\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{19}{162}\text{ArcTan}\left[\sqrt{3}+\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{19\,\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}-\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{108\sqrt{3}}+\frac{19\,\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}+\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{108\sqrt{3}}$$

Result (type 7, 133 leaves):

$$\frac{1}{486}\left(-\frac{18\,e^{\frac{\text{ArcTanh}[x]}{3}}\left(19+8\,e^{2\,\text{ArcTanh}[x]}+61\,e^{4\,\text{ArcTanh}[x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^3}+114\,\text{ArcTan}\left[e^{\frac{\text{ArcTanh}[x]}{3}}\right]+19\,\text{RootSum}\left[1-\#1^2+\#1^4\&,\frac{-2\,\text{ArcTanh}[x]+6\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2}{-\#1+2\,\#1^3}\&\right]\right)$$

Problem 122: Result is not expressed in closed-form.

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,x\,dx$$

Optimal (type 3, 224 leaves, 15 steps):

$$-\frac{1}{6}(1-x)^{5/6}(1+x)^{1/6}-\frac{1}{2}(1-x)^{5/6}(1+x)^{7/6}-\frac{1}{9}\text{ArcTan}\left[\frac{(1-x)^{1/6}}{(1+x)^{1/6}}\right]+\frac{1}{18}\text{ArcTan}\left[\sqrt{3}-\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{1}{18}\text{ArcTan}\left[\sqrt{3}+\frac{2(1-x)^{1/6}}{(1+x)^{1/6}}\right]-\frac{\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}-\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{12\sqrt{3}}+\frac{\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}+\frac{\sqrt{3}(1-x)^{1/6}}{(1+x)^{1/6}}\right]}{12\sqrt{3}}$$

Result (type 7, 127 leaves):

$$\frac{1}{9}\left(-\frac{3\,e^{\frac{\text{ArcTanh}[x]}{3}}\left(1+7\,e^{2\,\text{ArcTanh}[x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^2}+\text{ArcTan}\left[e^{\frac{\text{ArcTanh}[x]}{3}}\right]\right)-$$

$$\frac{1}{54}\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\ \frac{2\,\text{ArcTanh}[x]-6\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]-\text{ArcTanh}[x]\,\#1^2+3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2}{-\#1+2\,\#1^3}\,\&\right]$$

Problem 123: Result is not expressed in closed-form.

$$\int e^{\frac{\text{ArcTanh}[x]}{3}}\,dx$$

Optimal (type 3, 202 leaves, 14 steps):

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

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

Result (type 7, 116 leaves):

$$-\frac{2\,e^{\frac{\text{ArcTanh}[x]}{3}}}{1+e^{2\,\text{ArcTanh}[x]}}+\frac{2}{3}\,\text{ArcTan}\left[e^{\frac{\text{ArcTanh}[x]}{3}}\right]-\frac{1}{9}\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\ \frac{2\,\text{ArcTanh}[x]-6\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]-\text{ArcTanh}[x]\,\#1^2+3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2}{-\#1+2\,\#1^3}\,\&\right]$$

Problem 124: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{\text{ArcTanh}[x]}{3}}}{x}\,dx$$

Optimal (type 3, 346 leaves, 25 steps):

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

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

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

Result (type 7, 220 leaves):

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

$$\frac{1}{2}\text{Log}\left[1+e^{\frac{\text{ArcTanh}[x]}{3}}+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\frac{1}{3}\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\ \frac{2\,\text{ArcTanh}[x]-6\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]-\text{ArcTanh}[x]\,\#1^2+3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2}{-\#1+2\,\#1^3}\,\&\right]$$

Problem 127: Unable to integrate problem.

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,x^m\,dx$$

Optimal (type 6, 28 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{3},-\frac{1}{3},2+m,x,-x\right]}{1+m}$$

Result (type 8, 14 leaves):

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,x^m\,dx$$

Problem 128: Result is not expressed in closed-form.

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,x^2\,dx$$

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

$$-\frac{11}{27}(1-x)^{2/3}(1+x)^{1/3}-\frac{1}{9}(1-x)^{2/3}(1+x)^{4/3}-\frac{1}{3}(1-x)^{2/3}\,x\,(1+x)^{4/3}+\frac{22\,\text{ArcTan}\left[\frac{1}{\sqrt{3}}-\frac{2\,(1-x)^{1/3}}{\sqrt{3}\,(1+x)^{1/3}}\right]}{27\sqrt{3}}+\frac{11}{81}\text{Log}[1+x]+\frac{11}{27}\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}\right]$$

Result (type 7, 154 leaves):

$$\frac{2}{243}\left(-\frac{324\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^3}+\frac{540\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^2}-\frac{315\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{1+e^{2\,\text{ArcTanh}[x]}}-22\,\text{ArcTanh}[x]+33\,\text{Log}\left[1+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-11\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\frac{\text{ArcTanh}[x]-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2}{-2+\#1^2}\,\&\right]\right)$$

Problem 129: Result is not expressed in closed-form.

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,x\,dx$$

Optimal (type 3, 112 leaves, 4 steps):

$$-\frac{1}{3}(1-x)^{2/3}(1+x)^{1/3}-\frac{1}{2}(1-x)^{2/3}(1+x)^{4/3}+\frac{2\,\text{ArcTan}\left[\frac{1}{\sqrt{3}}-\frac{2\,(1-x)^{1/3}}{\sqrt{3}\,(1+x)^{1/3}}\right]}{3\sqrt{3}}+\frac{1}{9}\text{Log}[1+x]+\frac{1}{3}\text{Log}\left[1+\frac{(1-x)^{1/3}}{(1+x)^{1/3}}\right]$$

Result (type 7, 124 leaves):

$$\frac{2}{27}\left(-\frac{9\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}\left(1+4\,e^{2\,\text{ArcTanh}[x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[x]}\right)^2}-2\,\text{ArcTanh}[x]+3\,\text{Log}\left[1+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\frac{\text{ArcTanh}[x]-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2}{-2+\#1^2}\,\&\right]\right)$$

Problem 130: Result is not expressed in closed-form.

$$\int e^{\frac{2\,\text{ArcTanh}[x]}{3}}\,dx$$

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

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

Result (type 7, 116 leaves):

$$-\frac{2\,e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{1+e^{2\,\text{ArcTanh}[x]}}-\frac{4\,\text{ArcTanh}[x]}{9}+\frac{2}{3}\,\text{Log}\left[1+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-$$
$$\frac{2}{9}\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\ \frac{\text{ArcTanh}[x]-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2}{-2+\#1^2}\,\&\right]$$

Problem 131: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{2\,\text{ArcTanh}[x]}{3}}}{x}\,dx$$

Optimal (type 3, 135 leaves, 4 steps):

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

Result (type 7, 215 leaves):

$$-\sqrt{3}\,\text{ArcTan}\left[\frac{-1+2\,e^{\frac{\text{ArcTanh}[x]}{3}}}{\sqrt{3}}\right]+\sqrt{3}\,\text{ArcTan}\left[\frac{1+2\,e^{\frac{\text{ArcTanh}[x]}{3}}}{\sqrt{3}}\right]-\frac{2\,\text{ArcTanh}[x]}{3}+\text{Log}\left[1-e^{\frac{\text{ArcTanh}[x]}{3}}\right]+$$
$$\text{Log}\left[1+e^{\frac{\text{ArcTanh}[x]}{3}}\right]+\text{Log}\left[1+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\frac{1}{2}\,\text{Log}\left[1-e^{\frac{\text{ArcTanh}[x]}{3}}+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-\frac{1}{2}\,\text{Log}\left[1+e^{\frac{\text{ArcTanh}[x]}{3}}+e^{\frac{2\,\text{ArcTanh}[x]}{3}}\right]-$$
$$\frac{1}{3}\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\ \frac{\text{ArcTanh}[x]-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]+\text{ArcTanh}[x]\,\#1^2-3\,\text{Log}\left[e^{\frac{\text{ArcTanh}[x]}{3}}-\#1\right]\#1^2}{-2+\#1^2}\,\&\right]$$

Problem 134: Unable to integrate problem.

$$\int e^{\frac{1}{4}\,\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 31 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\frac{1}{8},-\frac{1}{8},2+m,a\,x,-a\,x\right]}{1+m}$$

Result (type 8, 16 leaves):

$$\int e^{\frac{1}{4}\,\text{ArcTanh}[a\,x]}\,x^m\,dx$$

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

$$\int e^{\frac{1}{4}\text{ArcTanh}[a x]} x^2 \, dx$$

Optimal (type 3, 646 leaves, 27 steps):

$$-\frac{11 (1-a x)^{7/8} (1+a x)^{1/8}}{32 a^3}-\frac{(1-a x)^{7/8} (1+a x)^{9/8}}{24 a^3}-\frac{x (1-a x)^{7/8} (1+a x)^{9/8}}{3 a^2}+\frac{11 \sqrt{2+\sqrt{2}}\, \text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{128 a^3}+$$
$$\frac{11 \sqrt{2-\sqrt{2}}\, \text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{128 a^3}-\frac{11 \sqrt{2+\sqrt{2}}\, \text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{128 a^3}-\frac{11 \sqrt{2-\sqrt{2}}\, \text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{128 a^3}-$$
$$\frac{11 \sqrt{2-\sqrt{2}}\, \text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\, (1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{256 a^3}+\frac{11 \sqrt{2-\sqrt{2}}\, \text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\, (1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{256 a^3}-$$
$$\frac{11 \sqrt{2+\sqrt{2}}\, \text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\, (1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{256 a^3}+\frac{11 \sqrt{2+\sqrt{2}}\, \text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\, (1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{256 a^3}$$

Result (type 7, 94 leaves):

$$\frac{-\frac{e^{\frac{1}{4}\text{ArcTanh}[a x]}\left(33+10\, e^{2\,\text{ArcTanh}[a x]}+105\, e^{4\,\text{ArcTanh}[a x]}\right)}{48\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^3}-\frac{11}{512}\text{RootSum}\left[1+\#1^8\,\&,\ \frac{\text{ArcTanh}[a x]-4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a x]}-\#1\right]}{\#1^7}\,\&\right]}{a^3}$$

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

$$\int e^{\frac{1}{4}\text{ArcTanh}[a x]} x \, dx$$

Optimal (type 3, 619 leaves, 26 steps):

$$-\frac{(1-a x)^{7/8}(1+a x)^{1/8}}{8 a^2}-\frac{(1-a x)^{7/8}(1+a x)^{9/8}}{2 a^2}+\frac{\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2(1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{32 a^2}+\frac{\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2(1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{32 a^2}-\frac{\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2(1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{32 a^2}-\frac{\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2(1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{32 a^2}-\frac{\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{64 a^2}+\frac{\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{64 a^2}-\frac{\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{64 a^2}+\frac{\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{64 a^2}$$

Result (type 7, 83 leaves):

$$\frac{-\frac{32\,e^{\frac{1}{4}\text{ArcTanh}[a x]}\left(1+9\,e^{2\,\text{ArcTanh}[a x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^2}+\text{RootSum}\left[1+\#1^8\,\&,\ \frac{-\text{ArcTanh}[a x]+4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a x]}-\#1\right]}{\#1^7}\,\&\right]}{128 a^2}$$

Problem 137: Result is not expressed in closed-form.

$$\int e^{\frac{1}{4}\text{ArcTanh}[a x]}\,dx$$

Optimal (type 3, 591 leaves, 25 steps):

$$-\frac{(1-a x)^{7/8}(1+a x)^{1/8}}{a}+\frac{\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2(1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{4 a}+\frac{\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2(1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{4 a}-\frac{\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2(1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{4 a}-\frac{\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2(1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{4 a}-\frac{\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{8 a}+\frac{\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{8 a}-\frac{\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{8 a}+\frac{\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]}{8 a}$$

Result (type 7, 71 leaves):

$$\frac{-\frac{32\,e^{\frac{1}{4}\text{ArcTanh}[a x]}}{1+e^{2\,\text{ArcTanh}[a x]}}+\text{RootSum}\left[1+\#1^8\,\&,\ \frac{-\text{ArcTanh}[a x]+4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a x]}-\#1\right]}{\#1^7}\,\&\right]}{16 a}$$

Problem 138: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{4}\text{ArcTanh}[a x]}}{x}\,dx$$

Optimal (type 3, 759 leaves, 39 steps):

$$-2\,\text{ArcTan}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]+\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]-$$
$$\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]-\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2 (1-a x)^{1/8}}{(1+a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]+\sqrt{2}\;\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]-$$
$$\sqrt{2}\;\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]-2\,\text{ArcTanh}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]-\frac{1}{2}\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]+$$
$$\frac{1}{2}\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]-\frac{1}{2}\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]+$$
$$\frac{1}{2}\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-a x)^{1/4}}{(1+a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-a x)^{1/8}}{(1+a x)^{1/8}}\right]+\frac{\text{Log}\left[1-\frac{\sqrt{2}\,(1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{2}\,(1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 128 leaves):

$$-2\,\text{ArcTan}\left[e^{\frac{1}{4}\text{ArcTanh}[a x]}\right]+\text{Log}\left[1-e^{\frac{1}{4}\text{ArcTanh}[a x]}\right]-\text{Log}\left[1+e^{\frac{1}{4}\text{ArcTanh}[a x]}\right]+$$
$$\frac{1}{4}\,\text{RootSum}\left[1+\#1^4\,\&,\;\frac{\text{ArcTanh}[a x]-4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]+\frac{1}{4}\,\text{RootSum}\left[1+\#1^8\,\&,\;\frac{-\text{ArcTanh}[a x]+4\,\text{Log}\left[e^{\frac{1}{4}\text{ArcTanh}[a x]}-\#1\right]}{\#1^7}\,\&\right]$$

Problem 139: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{4}\text{ArcTanh}[a x]}}{x^2}\,dx$$

Optimal (type 3, 271 leaves, 16 steps):

$$-\frac{(1-a x)^{7/8}(1+a x)^{1/8}}{x}-\frac{1}{2} a \operatorname{ArcTan}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+\frac{a \operatorname{ArcTan}\left[1-\frac{\sqrt{2}(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]}{2 \sqrt{2}}-\frac{a \operatorname{ArcTan}\left[1+\frac{\sqrt{2}(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]}{2 \sqrt{2}}-$$
$$\frac{1}{2} a \operatorname{ArcTanh}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+\frac{a \operatorname{Log}\left[1-\frac{\sqrt{2}(1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{4 \sqrt{2}}-\frac{a \operatorname{Log}\left[1+\frac{\sqrt{2}(1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{4 \sqrt{2}}$$

Result (type 7, 113 leaves):

$$\frac{1}{16} a \left(4\left(-\frac{8 e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}}{-1+e^{2\operatorname{ArcTanh}[a x]}}-2\operatorname{ArcTan}\left[e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}\right]+\operatorname{Log}\left[1-e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}\right]-\operatorname{Log}\left[1+e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}\right]\right)+\right.$$
$$\left.\operatorname{RootSum}\left[1+\#1^4\,\&,\ \frac{\operatorname{ArcTanh}[a x]-4\operatorname{Log}\left[e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 140: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}}{x^3}\,dx$$

Optimal (type 3, 312 leaves, 17 steps):

$$-\frac{a(1-a x)^{7/8}(1+a x)^{1/8}}{8 x}-\frac{(1-a x)^{7/8}(1+a x)^{9/8}}{2 x^2}-\frac{1}{16} a^2 \operatorname{ArcTan}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+\frac{a^2 \operatorname{ArcTan}\left[1-\frac{\sqrt{2}(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]}{16 \sqrt{2}}-$$
$$\frac{a^2 \operatorname{ArcTan}\left[1+\frac{\sqrt{2}(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]}{16 \sqrt{2}}-\frac{1}{16} a^2 \operatorname{ArcTanh}\left[\frac{(1+a x)^{1/8}}{(1-a x)^{1/8}}\right]+\frac{a^2 \operatorname{Log}\left[1-\frac{\sqrt{2}(1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{32 \sqrt{2}}-\frac{a^2 \operatorname{Log}\left[1+\frac{\sqrt{2}(1+a x)^{1/8}}{(1-a x)^{1/8}}+\frac{(1+a x)^{1/4}}{(1-a x)^{1/4}}\right]}{32 \sqrt{2}}$$

Result (type 7, 139 leaves):

$$\frac{1}{128} a^2 \left(4\left(-\frac{64 e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}}{\left(-1+e^{2\operatorname{ArcTanh}[a x]}\right)^2}-\frac{72 e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}}{-1+e^{2\operatorname{ArcTanh}[a x]}}-2\operatorname{ArcTan}\left[e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}\right]+\operatorname{Log}\left[1-e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}\right]-\operatorname{Log}\left[1+e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}\right]\right)+\right.$$
$$\left.\operatorname{RootSum}\left[1+\#1^4\,\&,\ \frac{\operatorname{ArcTanh}[a x]-4\operatorname{Log}\left[e^{\frac{1}{4}\operatorname{ArcTanh}[a x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 142: Result unnecessarily involves higher level functions.

$$\int e^{3\,\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 151 leaves, 9 steps):

$$-\frac{3\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}-\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}+\frac{4\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}+\frac{4\,a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}$$

Result (type 6, 265 leaves):

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

Problem 144: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int e^{\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 74 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}+\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}$$

Result (type 6, 166 leaves):

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

Problem 145: Result unnecessarily involves higher level functions.

$$\int e^{-\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 75 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}-\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}$$

Result (type 6, 134 leaves):

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

Problem 147: Result unnecessarily involves higher level functions.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 150 leaves, 9 steps):

$$-\frac{3\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}+\frac{a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}+\frac{4\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{1+m}-\frac{4\,a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{2+m}{2},\frac{4+m}{2},a^2\,x^2\right]}{2+m}$$

Result (type 6, 237 leaves):

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

Problem 148: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a x]}\,x^m\,dx$$

Optimal (type 6, 35 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\Big[1+m,\frac{n}{2},-\frac{n}{2},2+m,a x,-a x\Big]}{1+m}$$

Result (type 8, 14 leaves):

$$\int e^{n\,\text{ArcTanh}[a x]}\,x^m\,dx$$

Problem 211: Unable to integrate problem.

$$\int \frac{e^{-2\,\text{ArcTanh}[a x]}}{c-a c x}\,dx$$

Optimal (type 3, 13 leaves, 2 steps):

$$\frac{\text{Log}[1+a x]}{a c}$$

Result (type 8, 20 leaves):

$$\int \frac{e^{-2\,\text{ArcTanh}[a x]}}{c-a c x}\,dx$$

Problem 212: Unable to integrate problem.

$$\int \frac{e^{-2\,\text{ArcTanh}[a x]}}{(c-a c x)^2}\,dx$$

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

$$\frac{\text{ArcTanh}[a\,x]}{a\,c^2}$$

Result (type 8, 20 leaves):

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{(c-a\,c\,x)^2}\,dx$$

Problem 278: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{7/2}\,dx$$

Optimal (type 5, 81 leaves, 3 steps):

$$-\frac{2^{1+\frac{n}{2}}\,(1-a\,x)^{-n/2}\,(c-a\,c\,x)^{9/2}\,\text{Hypergeometric2F1}\left[\frac{9-n}{2},-\frac{n}{2},\frac{11-n}{2},\frac{1}{2}\,(1-a\,x)\right]}{a\,c\,(9-n)}$$

Result (type 8, 22 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{7/2}\,dx$$

Problem 279: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{5/2}\,dx$$

Optimal (type 5, 81 leaves, 3 steps):

$$-\frac{2^{1+\frac{n}{2}}\,(1-a\,x)^{-n/2}\,(c-a\,c\,x)^{7/2}\,\text{Hypergeometric2F1}\left[\frac{7-n}{2},-\frac{n}{2},\frac{9-n}{2},\frac{1}{2}\,(1-a\,x)\right]}{a\,c\,(7-n)}$$

Result (type 8, 22 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{5/2}\,dx$$

Problem 280: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^{3/2}\,dx$$

Optimal (type 5, 81 leaves, 3 steps):

$$-\frac{2^{1+\frac{n}{2}} (1-a x)^{-n/2} (c-a c x)^{5/2} \text{Hypergeometric2F1}\left[\frac{5-n}{2}, -\frac{n}{2}, \frac{7-n}{2}, \frac{1}{2} (1-a x)\right]}{a c (5-n)}$$

Result (type 8, 22 leaves) :

$$\int e^{n \text{ArcTanh}[a x]} (c-a c x)^{3/2} \, dx$$

Problem 281: Unable to integrate problem.

$$\int e^{n \text{ArcTanh}[a x]} \sqrt{c-a c x} \, dx$$

Optimal (type 5, 81 leaves, 3 steps) :

$$-\frac{2^{1+\frac{n}{2}} (1-a x)^{-n/2} (c-a c x)^{3/2} \text{Hypergeometric2F1}\left[\frac{3-n}{2}, -\frac{n}{2}, \frac{5-n}{2}, \frac{1}{2} (1-a x)\right]}{a c (3-n)}$$

Result (type 8, 22 leaves) :

$$\int e^{n \text{ArcTanh}[a x]} \sqrt{c-a c x} \, dx$$

Problem 282: Unable to integrate problem.

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{\sqrt{c-a c x}} \, dx$$

Optimal (type 5, 81 leaves, 3 steps) :

$$-\frac{2^{1+\frac{n}{2}} (1-a x)^{-n/2} \sqrt{c-a c x} \text{Hypergeometric2F1}\left[\frac{1-n}{2}, -\frac{n}{2}, \frac{3-n}{2}, \frac{1}{2} (1-a x)\right]}{a c (1-n)}$$

Result (type 8, 22 leaves) :

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{\sqrt{c-a c x}} \, dx$$

Problem 283: Unable to integrate problem.

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{3/2}} \, dx$$

Optimal (type 5, 78 leaves, 3 steps) :

$$\frac{2^{1+\frac{n}{2}} (1-a x)^{-n/2} \text{Hypergeometric2F1}\left[\frac{1}{2}(-1-n), -\frac{n}{2}, \frac{1-n}{2}, \frac{1}{2}(1-a x)\right]}{a c (1+n) \sqrt{c-a c x}}$$

Result (type 8, 22 leaves):

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{3/2}} \, dx$$

Problem 284: Unable to integrate problem.

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{5/2}} \, dx$$

Optimal (type 5, 78 leaves, 3 steps):

$$\frac{2^{1+\frac{n}{2}} (1-a x)^{-n/2} \text{Hypergeometric2F1}\left[\frac{1}{2}(-3-n), -\frac{n}{2}, \frac{1}{2}(-1-n), \frac{1}{2}(1-a x)\right]}{a c (3+n) (c-a c x)^{3/2}}$$

Result (type 8, 22 leaves):

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{5/2}} \, dx$$

Problem 285: Unable to integrate problem.

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{7/2}} \, dx$$

Optimal (type 5, 78 leaves, 3 steps):

$$\frac{2^{1+\frac{n}{2}} (1-a x)^{-n/2} \text{Hypergeometric2F1}\left[\frac{1}{2}(-5-n), -\frac{n}{2}, \frac{1}{2}(-3-n), \frac{1}{2}(1-a x)\right]}{a c (5+n) (c-a c x)^{5/2}}$$

Result (type 8, 22 leaves):

$$\int \frac{e^{n \text{ArcTanh}[a x]}}{(c-a c x)^{7/2}} \, dx$$

Problem 378: Result more than twice size of optimal antiderivative.

$$\int e^{\text{ArcTanh}[x]} \sqrt{1-x} \, dx$$

Optimal (type 2, 11 leaves, 3 steps):

$$\frac{2}{3}(1+x)^{3/2}$$

Result (type 2, 27 leaves):

$$\frac{2(1+x)\sqrt{1-x^2}}{3\sqrt{1-x}}$$

Problem 387: Unable to integrate problem.

$$\int e^{\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a\,c\,x}\;dx$$

Optimal (type 5, 64 leaves, 4 steps):

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

Result (type 8, 23 leaves):

$$\int e^{\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a\,c\,x}\;dx$$

Problem 411: Unable to integrate problem.

$$\int e^{-\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a\,c\,x}\;dx$$

Optimal (type 5, 114 leaves, 5 steps):

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

Result (type 8, 25 leaves):

$$\int e^{-\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a\,c\,x}\;dx$$

Problem 437: Unable to integrate problem.

$$\int e^{-2\,p\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^p\;dx$$

Optimal (type 5, 61 leaves, 3 steps):

$$-\frac{2^{-p} (1-a x)^p (c-a c x)^{1+p} \text{Hypergeometric2F1}\left[p, 1+2 p, 2 (1+p), \frac{1}{2} (1-a x)\right]}{a c (1+2 p)}$$

Result (type 8, 21 leaves):

$$\int e^{-2 p \text{ArcTanh}[a x]} (c-a c x)^p \, dx$$

Problem 439: Unable to integrate problem.

$$\int e^{n \text{ArcTanh}[a x]} (c-a c x)^p \, dx$$

Optimal (type 5, 82 leaves, 3 steps):

$$-\frac{2^{1+\frac{n}{2}} (1-a x)^{-n/2} (c-a c x)^{1+p} \text{Hypergeometric2F1}\left[-\frac{n}{2}, 1-\frac{n}{2}+p, 2-\frac{n}{2}+p, \frac{1}{2} (1-a x)\right]}{a c (2-n+2 p)}$$

Result (type 8, 20 leaves):

$$\int e^{n \text{ArcTanh}[a x]} (c-a c x)^p \, dx$$

Problem 440: Result more than twice size of optimal antiderivative.

$$\int e^{n \text{ArcTanh}[a x]} (c-a c x)^3 \, dx$$

Optimal (type 5, 68 leaves, 2 steps):

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

Result (type 5, 195 leaves):

$$-\frac{1}{24 a (2+n)} c^3 e^{n \text{ArcTanh}[a x]} \left(-e^{2 \text{ArcTanh}[a x]} n \left(-48+44 n-12 n^2+n^3\right) \text{Hypergeometric2F1}\left[1, 1+\frac{n}{2}, 2+\frac{n}{2}, -e^{2 \text{ArcTanh}[a x]}\right] + (2+n) \left(a n^3 x+n^2 \left(-1-12 a x+a^2 x^2\right)+2 n \left(6+21 a x-6 a^2 x^2+a^3 x^3\right) + 6 \left(-7-4 a x+6 a^2 x^2-4 a^3 x^3+a^4 x^4\right)+\left(-48+44 n-12 n^2+n^3\right) \text{Hypergeometric2F1}\left[1, \frac{n}{2}, 1+\frac{n}{2}, -e^{2 \text{ArcTanh}[a x]}\right]\right)\right)$$

Problem 441: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a\,c\,x)^2\,dx$$

Optimal (type 5, 68 leaves, 2 steps):

$$-\frac{2^{1+\frac{n}{2}}\,c^2\,(1-a\,x)^{3-\frac{n}{2}}\,\text{Hypergeometric2F1}\left[3-\frac{n}{2},-\frac{n}{2},4-\frac{n}{2},\frac{1}{2}\,(1-a\,x)\right]}{a\,(6-n)}$$

Result (type 5, 149 leaves):

$$\frac{1}{6\,a\,(2+n)}c^2\,e^{n\,\text{ArcTanh}[a\,x]}\left(-e^{2\,\text{ArcTanh}[a\,x]}\,n\,\left(8-6\,n+n^2\right)\,\text{Hypergeometric2F1}\left[1,1+\frac{n}{2},2+\frac{n}{2},-e^{2\,\text{ArcTanh}[a\,x]}\right]+\right.$$
$$\left.(2+n)\,\left(6+6\,a\,x+a\,n^2\,x-6\,a^2\,x^2+2\,a^3\,x^3+n\,\left(-1-6\,a\,x+a^2\,x^2\right)+\left(8-6\,n+n^2\right)\,\text{Hypergeometric2F1}\left[1,\frac{n}{2},1+\frac{n}{2},-e^{2\,\text{ArcTanh}[a\,x]}\right]\right)\right)$$

Problem 447: Unable to integrate problem.

$$\int e^{\text{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Optimal (type 6, 60 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a\,x}\right)^p\,x\,(1-a\,x)^{-p}\,\text{AppellF1}\left[1-p,\frac{1}{2}-p,-\frac{1}{2},2-p,a\,x,-a\,x\right]}{1-p}$$

Result (type 8, 22 leaves):

$$\int e^{\text{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Problem 456: Unable to integrate problem.

$$\int e^{2\,\text{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Optimal (type 5, 59 leaves, 6 steps):

$$-\left(c-\frac{c}{a\,x}\right)^p\,x-\frac{(2-p)\,\left(c-\frac{c}{a\,x}\right)^p\,\text{Hypergeometric2F1}\left[1,p,1+p,1-\frac{1}{a\,x}\right]}{a\,p}$$

Result (type 8, 24 leaves):

$$\int e^{2\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p dx$$

Problem 474: Unable to integrate problem.

$$\int e^{4\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p dx$$

Optimal (type 5, 93 leaves, 7 steps):

$$-\frac{c\,(5-p)\left(c-\frac{c}{a\,x}\right)^{-1+p}}{a\,(1-p)}+c\left(c-\frac{c}{a\,x}\right)^{-1+p}x+\frac{(4-p)\left(c-\frac{c}{a\,x}\right)^p \text{Hypergeometric2F1}\left[1,\,p,\,1+p,\,1-\frac{1}{a\,x}\right]}{a\,p}$$

Result (type 8, 24 leaves):

$$\int e^{4\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p dx$$

Problem 484: Unable to integrate problem.

$$\int e^{-\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p dx$$

Optimal (type 6, 60 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a\,x}\right)^p x\,(1-a\,x)^{-p}\,\text{AppellF1}\left[1-p,\,-\frac{1}{2}-p,\,\frac{1}{2},\,2-p,\,a\,x,\,-a\,x\right]}{1-p}$$

Result (type 8, 24 leaves):

$$\int e^{-\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p dx$$

Problem 493: Unable to integrate problem.

$$\int e^{-2\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^p dx$$

Optimal (type 5, 114 leaves, 8 steps):

$$-\frac{\left(c-\frac{c}{a\,x}\right)^{2+p}x}{c^2}-\frac{\left(c-\frac{c}{a\,x}\right)^{2+p}\text{Hypergeometric2F1}\left[1,\,2+p,\,3+p,\,\frac{a-\frac{1}{x}}{2\,a}\right]}{2\,a\,c^2\,(2+p)}+\frac{\left(c-\frac{c}{a\,x}\right)^{2+p}\text{Hypergeometric2F1}\left[1,\,2+p,\,3+p,\,1-\frac{1}{a\,x}\right]}{a\,c^2}$$

Result (type 8, 24 leaves):

$$\int e^{-2\,\text{ArcTanh}[a\,x]} \left(c-\frac{c}{a\,x}\right)^p dx$$

Problem 499: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 18 leaves, 5 steps):

$$-\frac{x}{c^2}+\frac{\text{ArcTanh}[a\,x]}{a\,c^2}$$

Result (type 3, 40 leaves):

$$-\frac{x}{c^2}-\frac{\text{Log}[1-a\,x]}{2\,a\,c^2}+\frac{\text{Log}[1+a\,x]}{2\,a\,c^2}$$

Problem 510: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a\,x]} \left(c-\frac{c}{a\,x}\right)^{9/2} dx$$

Optimal (type 3, 225 leaves, 8 steps):

$$-\frac{a^3 \left(c-\frac{c}{a\,x}\right)^{9/2} x^4 \,(54-227\,a\,x)\,\sqrt{1+a\,x}}{105\,(1-a\,x)^{9/2}}-\frac{10\,a^2 \left(c-\frac{c}{a\,x}\right)^{9/2} x^3 \sqrt{1+a\,x}}{21\,(1-a\,x)^{5/2}}+\frac{2\,a \left(c-\frac{c}{a\,x}\right)^{9/2} x^2 \sqrt{1+a\,x}}{5\,(1-a\,x)^{3/2}}-\frac{2 \left(c-\frac{c}{a\,x}\right)^{9/2} x\,\sqrt{1+a\,x}}{7\,\sqrt{1-a\,x}}-\frac{7\,a^{7/2} \left(c-\frac{c}{a\,x}\right)^{9/2} x^{9/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a\,x)^{9/2}}$$

Result (type 3, 151 leaves):

$$-\frac{c^4 \sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(-30+162\,a\,x-356\,a^2\,x^2+292\,a^3\,x^3+105\,a^4\,x^4\right)}{105\,a^4\,x^3\,(-1+a\,x)}-\frac{7\,i\,c^{9/2}\,\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 511: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 181 leaves, 7 steps):

$$\frac{2\,a\left(c-\frac{c}{a\,x}\right)^{7/2}x^2\sqrt{1+a\,x}}{3\,(1-a\,x)^{3/2}}-\frac{2\left(c-\frac{c}{a\,x}\right)^{7/2}x\sqrt{1+a\,x}}{5\sqrt{1-a\,x}}-\frac{a^2\left(c-\frac{c}{a\,x}\right)^{7/2}x^3\sqrt{1+a\,x}\,(18+31\,a\,x)}{15\,(1-a\,x)^{7/2}}+\frac{5\,a^{5/2}\left(c-\frac{c}{a\,x}\right)^{7/2}x^{7/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a\,x)^{7/2}}$$

Result (type 3, 143 leaves):

$$-\frac{c^3\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(6-28\,a\,x+56\,a^2\,x^2+15\,a^3\,x^3\right)}{15\,a^3\,x^2\,(-1+a\,x)}-\frac{5\,i\,c^{7/2}\,\text{Log}\left[-i\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\sqrt{c-\frac{c}{a\,x}}\,x\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 512: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 171 leaves, 7 steps):

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

Result (type 3, 133 leaves):

$$\frac{c^2\left(-\frac{2\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(-2+10\,a\,x+3\,a^2\,x^2\right)}{x\,(-1+a\,x)}-9\,i\,a\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\sqrt{c-\frac{c}{a\,x}}\,x\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]\right)}{6\,a^2}$$

Problem 513: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 128 leaves, 7 steps):

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

Result (type 3, 119 leaves):

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

Problem 514: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}\,dx$$

Optimal (type 3, 84 leaves, 6 steps):

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

Result (type 3, 111 leaves):

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

Problem 515: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}}{\sqrt{c-\frac{c}{a\,x}}}\,dx$$

Optimal (type 3, 157 leaves, 8 steps):

$$-\frac{\sqrt{1-a\,x}\,\sqrt{1+a\,x}}{a\sqrt{c-\frac{c}{a\,x}}}-\frac{3\sqrt{1-a\,x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{3/2}\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}}+\frac{2\sqrt{2}\,\sqrt{1-a\,x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{a^{3/2}\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}}$$

Result (type 3, 203 leaves):

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

Problem 516: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 198 leaves, 9 steps):

$$\frac{\sqrt{1-a x}\,\sqrt{1+a x}}{a\left(c-\frac{c}{a x}\right)^{3/2}}+\frac{2\,(1-a x)^{3/2}\sqrt{1+a x}}{a^2\left(c-\frac{c}{a x}\right)^{3/2} x}+\frac{5\,(1-a x)^{3/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{5/2}\left(c-\frac{c}{a x}\right)^{3/2} x^{3/2}}-\frac{7\,(1-a x)^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{\sqrt{2}\,a^{5/2}\left(c-\frac{c}{a x}\right)^{3/2} x^{3/2}}$$

Result (type 3, 211 leaves):

$$\frac{1}{4 a}\left(-\frac{4 a\sqrt{c-\frac{c}{a x}}\; x\,(-2+a x)\,\sqrt{1-a^2 x^2}}{c^2\,(-1+a x)^2}+\frac{10\, i\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\; x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{c^{3/2}}-\frac{7\, i\sqrt{2}\,\text{Log}\left[\frac{4 a c\sqrt{c-\frac{c}{a x}}\; x\sqrt{1-a^2 x^2}-i\sqrt{2}\,c^{3/2}\left(-1-2 a x+3 a^2 x^2\right)}{7\,(-1+a x)^2}\right]}{c^{3/2}}\right)$$

Problem 517: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 249 leaves, 10 steps):

$$\frac{\sqrt{1-a x}\,\sqrt{1+a x}}{2 a\left(c-\frac{c}{a x}\right)^{5/2}}-\frac{11\,(1-a x)^{3/2}\sqrt{1+a x}}{8 a^2\left(c-\frac{c}{a x}\right)^{5/2} x}-\frac{23\,(1-a x)^{5/2}\sqrt{1+a x}}{8 a^3\left(c-\frac{c}{a x}\right)^{5/2} x^2}-\frac{7\,(1-a x)^{5/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{7/2}\left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}}+\frac{79\,(1-a x)^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{8\sqrt{2}\,a^{7/2}\left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}}$$

Result (type 3, 222 leaves):

$$\frac{1}{32\,a}\left(-\frac{4\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\,\left(23-35\,a\,x+8\,a^2\,x^2\right)}{c^3\,\left(-1+a\,x\right)^3}+\right.$$

$$\left.\frac{112\,\mathrm{i}\,\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{c^{5/2}}-\frac{79\,\mathrm{i}\,\sqrt{2}\,\mathrm{Log}\left[\frac{32\,a\,c^2\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}-8\,\mathrm{i}\,\sqrt{2}\,c^{5/2}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{79\,\left(-1+a\,x\right)^2}\right]}{c^{5/2}}\right)$$

Problem 527: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\mathrm{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^{9/2}\,dx$$

Optimal (type 3, 223 leaves, 8 steps):

$$-\frac{3\,a^3\,\left(c-\frac{c}{a\,x}\right)^{9/2}\,x^4\,\sqrt{1+a\,x}}{\left(1-a\,x\right)^{9/2}}+\frac{3\,a^2\,\left(c-\frac{c}{a\,x}\right)^{9/2}\,x^3\,\left(6-17\,a\,x\right)\,\left(1+a\,x\right)^{3/2}}{35\,\left(1-a\,x\right)^{9/2}}+$$

$$\frac{6\,a\,\left(c-\frac{c}{a\,x}\right)^{9/2}\,x^2\,\left(1+a\,x\right)^{3/2}}{35\,\left(1-a\,x\right)^{5/2}}-\frac{2\,\left(c-\frac{c}{a\,x}\right)^{9/2}\,x\,\left(1+a\,x\right)^{3/2}}{7\,\left(1-a\,x\right)^{3/2}}+\frac{3\,a^{7/2}\,\left(c-\frac{c}{a\,x}\right)^{9/2}\,x^{9/2}\,\mathrm{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\left(1-a\,x\right)^{9/2}}$$

Result (type 3, 151 leaves):

$$\frac{c^4\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(10-26\,a\,x-12\,a^2\,x^2+164\,a^3\,x^3+35\,a^4\,x^4\right)}{35\,a^4\,x^3\,\left(-1+a\,x\right)}+\frac{3\,\mathrm{i}\,c^{9/2}\,\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 528: Result unnecessarily involves imaginary or complex numbers.

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

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

$$-\frac{a^3\left(c-\frac{c}{a x}\right)^{7/2} x^4 \sqrt{1+a x}}{(1-a x)^{7/2}}+\frac{2 a^2\left(c-\frac{c}{a x}\right)^{7/2} x^3 (1+a x)^{3/2}}{3 (1-a x)^{7/2}}-\frac{2\left(c-\frac{c}{a x}\right)^{7/2} x (1+a x)^{5/2}}{5 (1-a x)^{7/2}}+\frac{4 a\left(c-\frac{c}{a x}\right)^{7/2} x^2 (1+a x)^{5/2}}{3 (1-a x)^{7/2}}-\frac{a^{5/2}\left(c-\frac{c}{a x}\right)^{7/2} x^{7/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{7/2}}$$

Result (type 3, 143 leaves):

$$\frac{c^3 \sqrt{c-\frac{c}{a x}} \sqrt{1-a^2 x^2} \left(-6+8 a x+44 a^2 x^2+15 a^3 x^3\right)}{15 a^3 x^2 (-1+a x)}+\frac{i c^{7/2} \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 529: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 176 leaves, 8 steps):

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

Result (type 3, 133 leaves):

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

Problem 530: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 127 leaves, 7 steps):

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

Result (type 3, 118 leaves):

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

Problem 531: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\,dx$$

Optimal (type 3, 155 leaves, 8 steps):

$$-\frac{\sqrt{c-\frac{c}{a x}}\,x\sqrt{1+a x}}{\sqrt{1-a x}}-\frac{5\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{a}\,\sqrt{1-a x}}+\frac{4\sqrt{2}\,\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{\sqrt{a}\,\sqrt{1-a x}}$$

Result (type 3, 204 leaves):

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

Problem 532: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{3\,\text{ArcTanh}[a x]}}{\sqrt{c-\frac{c}{a x}}}\,dx$$

Optimal (type 3, 195 leaves, 9 steps):

$$\frac{2\sqrt{1-a x}\,\sqrt{1+a x}}{a\sqrt{c-\frac{c}{a x}}}+\frac{(1+a x)^{3/2}}{a\sqrt{c-\frac{c}{a x}}\,\sqrt{1-a x}}+\frac{7\sqrt{1-a x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{3/2}\sqrt{c-\frac{c}{a x}}\,\sqrt{x}}-\frac{5\sqrt{2}\,\sqrt{1-a x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a x}}\right]}{a^{3/2}\sqrt{c-\frac{c}{a x}}\,\sqrt{x}}$$

Result (type 3, 210 leaves):

$$\frac{1}{2 a}\left(\frac{2 a\sqrt{c-\frac{c}{a x}}\,x\,(-3+a x)\sqrt{1-a^2 x^2}}{c\,(-1+a x)^2}-\frac{7\,i\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{\sqrt{c}}+\frac{5\,i\sqrt{2}\,\text{Log}\left[\frac{-4 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}+i\sqrt{2}\,\sqrt{c}\,(-1-2 a x+3 a^2 x^2)}{10\,(-1+a x)^2}\right]}{\sqrt{c}}\right)$$

Problem 533: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 249 leaves, 10 steps):

$$-\frac{21\,(1-a\,x)^{3/2}\,\sqrt{1+a\,x}}{8\,a^2\,\left(c-\frac{c}{a\,x}\right)^{3/2}\,x}+\frac{(1+a\,x)^{3/2}}{2\,a\,\left(c-\frac{c}{a\,x}\right)^{3/2}\,\sqrt{1-a\,x}}-\frac{9\,\sqrt{1-a\,x}\,(1+a\,x)^{3/2}}{8\,a^2\,\left(c-\frac{c}{a\,x}\right)^{3/2}\,x}-\frac{9\,(1-a\,x)^{3/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{5/2}\,\left(c-\frac{c}{a\,x}\right)^{3/2}\,x^{3/2}}+\frac{51\,(1-a\,x)^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{4\,\sqrt{2}\,a^{5/2}\,\left(c-\frac{c}{a\,x}\right)^{3/2}\,x^{3/2}}$$

Result (type 3, 220 leaves):

$$\frac{1}{16\,a}\left(\frac{4\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}\,\left(15-23\,a\,x+4\,a^2\,x^2\right)}{c^2\,(-1+a\,x)^3}-\frac{72\,i\,\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{c^{3/2}}+\frac{51\,i\,\sqrt{2}\,\text{Log}\left[\frac{-16\,a\,c\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+4\,i\,\sqrt{2}\,c^{3/2}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{51\,(-1+a\,x)^2}\right]}{c^{3/2}}\right)$$

Problem 534: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 293 leaves, 11 steps):

$$\frac{103\,(1-a\,x)^{5/2}\,\sqrt{1+a\,x}}{32\,a^3\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x^2}+\frac{(1+a\,x)^{3/2}}{3\,a\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,\sqrt{1-a\,x}}-\frac{13\,\sqrt{1-a\,x}\,(1+a\,x)^{3/2}}{24\,a^2\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x}+\frac{43\,(1-a\,x)^{3/2}\,(1+a\,x)^{3/2}}{32\,a^3\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x^2}+\frac{11\,(1-a\,x)^{5/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{7/2}\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x^{5/2}}-\frac{249\,(1-a\,x)^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{16\,\sqrt{2}\,a^{7/2}\,\left(c-\frac{c}{a\,x}\right)^{5/2}\,x^{5/2}}$$

Result (type 3, 232 leaves):

$$\frac{1}{64\,a}\left(\frac{4\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}\,\left(-219+554\,a\,x-415\,a^2\,x^2+48\,a^3\,x^3\right)}{3\,c^3\,(-1+a\,x)^4}-\frac{352\,i\,\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{c^{5/2}}+\frac{249\,i\,\sqrt{2}\,\text{Log}\left[\frac{-64\,a\,c^2\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+16\,i\,\sqrt{2}\,c^{5/2}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{249\,(-1+a\,x)^2}\right]}{c^{5/2}}\right)$$

Problem 535: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^{9/2}dx$$

Optimal (type 3, 225 leaves, 8 steps):

$$-\frac{94\,a^2\left(c-\frac{c}{a\,x}\right)^{9/2}x^3\,\sqrt{1+a\,x}}{21\,(1-a\,x)^{5/2}}+\frac{6\,a\left(c-\frac{c}{a\,x}\right)^{9/2}x^2\,\sqrt{1+a\,x}}{5\,(1-a\,x)^{3/2}}-\frac{2\left(c-\frac{c}{a\,x}\right)^{9/2}x\,\sqrt{1+a\,x}}{7\,\sqrt{1-a\,x}}+\frac{a^3\left(c-\frac{c}{a\,x}\right)^{9/2}x^4\,\sqrt{1+a\,x}\,(2718+521\,a\,x)}{105\,(1-a\,x)^{9/2}}+\frac{11\,a^{7/2}\left(c-\frac{c}{a\,x}\right)^{9/2}x^{9/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a\,x)^{9/2}}$$

Result (type 3, 151 leaves):

$$\frac{c^4\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(30-246\,a\,x+1028\,a^2\,x^2-4156\,a^3\,x^3+105\,a^4\,x^4\right)}{105\,a^4\,x^3\,(-1+a\,x)}+\frac{11\,i\,c^{9/2}\,\text{Log}\left[-i\,\sqrt{c}\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 536: Result unnecessarily involves imaginary or complex numbers.

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

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

$$\frac{2\,a\left(c-\frac{c}{a\,x}\right)^{7/2}x^2\,\sqrt{1+a\,x}}{(1-a\,x)^{3/2}}-\frac{2\left(c-\frac{c}{a\,x}\right)^{7/2}x\,\sqrt{1+a\,x}}{5\,\sqrt{1-a\,x}}-\frac{a^2\left(c-\frac{c}{a\,x}\right)^{7/2}x^3\,\sqrt{1+a\,x}\,(66+7\,a\,x)}{5\,(1-a\,x)^{7/2}}-\frac{9\,a^{5/2}\left(c-\frac{c}{a\,x}\right)^{7/2}x^{7/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a\,x)^{7/2}}$$

Result (type 3, 143 leaves):

$$\frac{c^3 \sqrt{c-\frac{c}{a x}}\,\sqrt{1-a^2 x^2}\,\left(-2+16 a x-92 a^2 x^2+5 a^3 x^3\right)}{5 a^3 x^2 (-1+a x)}+\frac{9\,\mathrm{i}\,c^{7/2}\,\mathrm{Log}\left[-\mathrm{i}\sqrt{c}\,(1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 537: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\mathrm{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^{5/2} dx$$

Optimal (type 3, 137 leaves, 6 steps):

$$-\frac{2\left(c-\frac{c}{a x}\right)^{5/2} x\sqrt{1+a x}}{3\sqrt{1-a x}}+\frac{a\left(c-\frac{c}{a x}\right)^{5/2} x^2\,(18-a x)\sqrt{1+a x}}{3\,(1-a x)^{5/2}}+\frac{7 a^{3/2}\left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}\,\mathrm{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{(1-a x)^{5/2}}$$

Result (type 3, 135 leaves):

$$\frac{c^2\sqrt{c-\frac{c}{a x}}\,\sqrt{1-a^2 x^2}\,\left(2-22 a x+3 a^2 x^2\right)}{3 a^2 x\,(-1+a x)}+\frac{7\,\mathrm{i}\,c^{5/2}\,\mathrm{Log}\left[-\mathrm{i}\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 538: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\mathrm{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^{3/2} dx$$

Optimal (type 3, 126 leaves, 6 steps):

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

Result (type 3, 118 leaves):

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

Problem 539: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\mathrm{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\,dx$$

Optimal (type 3, 90 leaves, 6 steps):

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

Result (type 3, 110 leaves):

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

Problem 540: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\text{ArcTanh}[a x]}}{\sqrt{c-\frac{c}{a x}}}\, dx$$

Optimal (type 3, 88 leaves, 6 steps):

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

Result (type 3, 113 leaves):

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

Problem 541: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 159 leaves, 9 steps):

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

Result (type 3, 205 leaves):

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

Problem 542: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\operatorname{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{5/2}}\, dx$$

Optimal (type 3, 208 leaves, 9 steps):

$$\frac{(1-a x)^{3/2} \sqrt{1+a x}}{2 a^2 \left(c-\frac{c}{a x}\right)^{5/2} x}+\frac{3 (1-a x)^{5/2} \sqrt{1+a x}}{2 a^3 \left(c-\frac{c}{a x}\right)^{5/2} x^2}+\frac{3 (1-a x)^{5/2} \operatorname{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{a^{7/2} \left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}}-\frac{9 (1-a x)^{5/2} \operatorname{ArcTanh}\left[\frac{\sqrt{2} \sqrt{a} \sqrt{x}}{\sqrt{1+a x}}\right]}{2 \sqrt{2}\, a^{7/2} \left(c-\frac{c}{a x}\right)^{5/2} x^{5/2}}$$

Result (type 3, 214 leaves):

$$\frac{1}{8 a}\left(\frac{4 a \sqrt{c-\frac{c}{a x}}\; x (-3+2 a x) \sqrt{1-a^2 x^2}}{c^3 (-1+a x)^2}-\frac{12 i \operatorname{Log}\left[-i \sqrt{c}\; (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{c^{5/2}}+\frac{9 i \sqrt{2} \operatorname{Log}\left[\frac{-8 a c^2 \sqrt{c-\frac{c}{a x}}\; x \sqrt{1-a^2 x^2}+2 i \sqrt{2}\, c^{5/2} \left(-1-2 a x+3 a^2 x^2\right)}{9 (-1+a x)^2}\right]}{c^{5/2}}\right)$$

Problem 543: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\operatorname{ArcTanh}[a x]}}{\left(c-\frac{c}{a x}\right)^{7/2}}\, dx$$

Optimal (type 3, 252 leaves, 10 steps):

$$\frac{(1-a x)^{3/2} \sqrt{1+a x}}{4 a^2 \left(c-\frac{c}{a x}\right)^{7/2} x}-\frac{15 (1-a x)^{5/2} \sqrt{1+a x}}{16 a^3 \left(c-\frac{c}{a x}\right)^{7/2} x^2}-\frac{35 (1-a x)^{7/2} \sqrt{1+a x}}{16 a^4 \left(c-\frac{c}{a x}\right)^{7/2} x^3}-\frac{5 (1-a x)^{7/2} \operatorname{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{a^{9/2} \left(c-\frac{c}{a x}\right)^{7/2} x^{7/2}}+\frac{115 (1-a x)^{7/2} \operatorname{ArcTanh}\left[\frac{\sqrt{2} \sqrt{a} \sqrt{x}}{\sqrt{1+a x}}\right]}{16 \sqrt{2}\, a^{9/2} \left(c-\frac{c}{a x}\right)^{7/2} x^{7/2}}$$

Result (type 3, 222 leaves):

$$\frac{1}{64\,a}\left(\frac{4\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\,\left(35-55\,a\,x+16\,a^2\,x^2\right)}{c^4\,\left(-1+a\,x\right)^3}-\frac{160\,\mathrm{i}\,\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{c^{7/2}}+\frac{115\,\mathrm{i}\,\sqrt{2}\,\mathrm{Log}\left[\frac{-64\,a\,c^3\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+16\,\mathrm{i}\,\sqrt{2}\,c^{7/2}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{115\,\left(-1+a\,x\right)^2}\right]}{c^{7/2}}\right)$$

Problem 554: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\mathrm{ArcTanh}[a\,x]}\left(c-\frac{c}{a\,x}\right)^{9/2}dx$$

Optimal (type 3, 267 leaves, 9 steps):

$$\frac{5\,a^4\left(c-\frac{c}{a\,x}\right)^{9/2}x^5\,\left(587-109\,a\,x\right)}{7\,\left(1-a\,x\right)^{9/2}\,\sqrt{1+a\,x}}+\frac{70\,a^3\left(c-\frac{c}{a\,x}\right)^{9/2}x^4}{\left(1-a\,x\right)^{5/2}\,\sqrt{1+a\,x}}-\frac{50\,a^2\left(c-\frac{c}{a\,x}\right)^{9/2}x^3}{7\,\left(1-a\,x\right)^{3/2}\,\sqrt{1+a\,x}}+\frac{10\,a\left(c-\frac{c}{a\,x}\right)^{9/2}x^2}{7\,\sqrt{1-a\,x}\,\sqrt{1+a\,x}}-\frac{2\left(c-\frac{c}{a\,x}\right)^{9/2}x\,\sqrt{1-a\,x}}{7\,\sqrt{1+a\,x}}-\frac{15\,a^{7/2}\left(c-\frac{c}{a\,x}\right)^{9/2}x^{9/2}\,\mathrm{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\left(1-a\,x\right)^{9/2}}$$

Result (type 3, 152 leaves):

$$\frac{c^4\,\sqrt{c-\frac{c}{a\,x}}\,\left(-2+20\,a\,x-110\,a^2\,x^2+720\,a^3\,x^3+1755\,a^4\,x^4+7\,a^5\,x^5\right)}{7\,a^4\,x^3\,\sqrt{1-a^2\,x^2}}-\frac{15\,\mathrm{i}\,c^{9/2}\,\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 555: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 225 leaves, 8 steps):

$$-\frac{a^3\left(c-\frac{c}{a x}\right)^{7/2} x^4 (2525-427 a x)}{15 (1-a x)^{7/2} \sqrt{1+a x}}-\frac{398 a^2\left(c-\frac{c}{a x}\right)^{7/2} x^3}{15 (1-a x)^{3/2} \sqrt{1+a x}}+\frac{38 a\left(c-\frac{c}{a x}\right)^{7/2} x^2}{15 \sqrt{1-a x} \sqrt{1+a x}}-\frac{2\left(c-\frac{c}{a x}\right)^{7/2} x \sqrt{1-a x}}{5 \sqrt{1+a x}}+\frac{13 a^{5/2}\left(c-\frac{c}{a x}\right)^{7/2} x^{7/2} \operatorname{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{7/2}}$$

Result (type 3, 144 leaves):

$$\frac{c^3 \sqrt{c-\frac{c}{a x}}\left(6-62 a x+548 a^2 x^2+1591 a^3 x^3+15 a^4 x^4\right)}{15 a^3 x^2 \sqrt{1-a^2 x^2}}-\frac{13 i c^{7/2} \operatorname{Log}\left[-i \sqrt{c}(1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 556: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3 \operatorname{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^{5/2} dx$$

Optimal (type 3, 181 leaves, 7 steps):

$$\frac{a^2\left(c-\frac{c}{a x}\right)^{5/2} x^3 (191-25 a x)}{3 (1-a x)^{5/2} \sqrt{1+a x}}+\frac{26 a\left(c-\frac{c}{a x}\right)^{5/2} x^2}{3 \sqrt{1-a x} \sqrt{1+a x}}-\frac{2\left(c-\frac{c}{a x}\right)^{5/2} x \sqrt{1-a x}}{3 \sqrt{1+a x}}-\frac{11 a^{3/2}\left(c-\frac{c}{a x}\right)^{5/2} x^{5/2} \operatorname{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{5/2}}$$

Result (type 3, 134 leaves):

$$\frac{c^2\left(\frac{2 \sqrt{c-\frac{c}{a x}}\left(-2+32 a x+133 a^2 x^2+3 a^3 x^3\right)}{x \sqrt{1-a^2 x^2}}-33 i a \sqrt{c} \operatorname{Log}\left[-i \sqrt{c}(1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}} x \sqrt{1-a^2 x^2}}{-1+a x}\right]\right)}{6 a^2}$$

Problem 557: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3 \operatorname{ArcTanh}[a x]}\left(c-\frac{c}{a x}\right)^{3/2} dx$$

Optimal (type 3, 133 leaves, 6 steps):

$$-\frac{2\left(c-\frac{c}{a x}\right)^{3/2} x \sqrt{1-a x}}{\sqrt{1+a x}}-\frac{a\left(c-\frac{c}{a x}\right)^{3/2} x^2 (23-a x)}{(1-a x)^{3/2} \sqrt{1+a x}}+\frac{9 \sqrt{a}\left(c-\frac{c}{a x}\right)^{3/2} x^{3/2} \operatorname{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{(1-a x)^{3/2}}$$

Result (type 3, 119 leaves):

$$\frac{\frac{2\,c\,\sqrt{c-\frac{c}{a\,x}}\,\left(2+19\,a\,x+a^2\,x^2\right)}{\sqrt{1-a^2\,x^2}}-9\,i\,c^{3/2}\,\text{Log}\left[-i\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 558: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\,dx$$

Optimal (type 3, 123 leaves, 6 steps):

$$\frac{8\,\sqrt{c-\frac{c}{a\,x}}\,x}{\sqrt{1-a\,x}\,\sqrt{1+a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1+a\,x}}{\sqrt{1-a\,x}}-\frac{7\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{a}\,\sqrt{1-a\,x}}$$

Result (type 3, 108 leaves):

$$\frac{\sqrt{c-\frac{c}{a\,x}}\,x\,\left(9+a\,x\right)}{\sqrt{1-a^2\,x^2}}-\frac{7\,i\,\sqrt{c}\,\text{Log}\left[-i\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{2\,a}$$

Problem 559: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-3\,\text{ArcTanh}[a\,x]}}{\sqrt{c-\frac{c}{a\,x}}}\,dx$$

Optimal (type 3, 127 leaves, 7 steps):

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

Result (type 3, 140 leaves):

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

Problem 560: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 131 leaves, 7 steps):

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

Result (type 3, 111 leaves):

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

Problem 561: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 199 leaves, 9 steps):

$$\frac{(1-a\,x)^{5/2}}{a^2\left(c-\frac{c}{a\,x}\right)^{5/2}x\,\sqrt{1+a\,x}}-\frac{2\,(1-a\,x)^{5/2}\sqrt{1+a\,x}}{a^3\left(c-\frac{c}{a\,x}\right)^{5/2}x^2}+\frac{(1-a\,x)^{5/2}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{a^{7/2}\left(c-\frac{c}{a\,x}\right)^{5/2}x^{5/2}}+\frac{(1-a\,x)^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{2}\,a^{7/2}\left(c-\frac{c}{a\,x}\right)^{5/2}x^{5/2}}$$

Result (type 3, 205 leaves):

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

Problem 562: Result unnecessarily involves imaginary or complex numbers.

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

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

$$\frac{(1-a x)^{5/2}}{2 a^2 \left(c-\frac{c}{a x}\right)^{7/2} x \sqrt{1+a x}}-\frac{(1-a x)^{7/2}}{4 a^3 \left(c-\frac{c}{a x}\right)^{7/2} x^2 \sqrt{1+a x}}+\frac{7 (1-a x)^{7/2} \sqrt{1+a x}}{4 a^4 \left(c-\frac{c}{a x}\right)^{7/2} x^3}+\frac{(1-a x)^{7/2} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{a^{9/2} \left(c-\frac{c}{a x}\right)^{7/2} x^{7/2}}-\frac{11 (1-a x)^{7/2} \text{ArcTanh}\left[\frac{\sqrt{2} \sqrt{a} \sqrt{x}}{\sqrt{1+a x}}\right]}{4 \sqrt{2} a^{9/2} \left(c-\frac{c}{a x}\right)^{7/2} x^{7/2}}$$

Result (type 3, 228 leaves):

$$\frac{1}{16 a}\left(-\frac{4 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2} \left(-7+a x+4 a^2 x^2\right)}{c^4 (-1+a x)^2 (1+a x)}+\frac{8 i \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{c^{7/2}}-\frac{11 i \sqrt{2} \text{Log}\left[\frac{16 a c^3 \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}-4 i \sqrt{2} c^{7/2} \left(-1-2 a x+3 a^2 x^2\right)}{11 (-1+a x)^2}\right]}{c^{7/2}}\right)$$

Problem 565: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}}\, x^2 \, dx$$

Optimal (type 3, 179 leaves, 8 steps):

$$-\frac{\sqrt{c-\frac{c}{a x}}\, x \sqrt{1+a x}}{8 a^2 \sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\, x^2 \sqrt{1+a x}}{12 a \sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\, x^3 \sqrt{1+a x}}{3 \sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}} \sqrt{x} \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{8 a^{5/2} \sqrt{1-a x}}$$

Result (type 3, 128 leaves):

$$\frac{-\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2} \left(-3+2 a x+8 a^2 x^2\right)}{-1+a x}+3 i \sqrt{c} \text{Log}\left[-i \sqrt{c} (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]}{48 a^3}$$

Problem 566: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}\;x\,dx$$

Optimal (type 3, 135 leaves, 7 steps):

$$\frac{\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1+a\,x}}{4\,a\,\sqrt{1-a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\;x^2\,\sqrt{1+a\,x}}{2\,\sqrt{1-a\,x}}-\frac{\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\;\sqrt{x}\right]}{4\,a^{3/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 120 leaves):

$$-\frac{\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,(1+2\,a\,x)\,\sqrt{1-a^2\,x^2}}{-1+a\,x}+i\,\sqrt{c}\;\text{Log}\left[-i\,\sqrt{c}\;(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{8\,a^2}$$

Problem 567: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}\;dx$$

Optimal (type 3, 85 leaves, 6 steps):

$$\frac{\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1+a\,x}}{\sqrt{1-a\,x}}+\frac{\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\;\sqrt{x}\right]}{\sqrt{a}\;\sqrt{1-a\,x}}$$

Result (type 3, 111 leaves):

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

Problem 568: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}}{x}\,dx$$

Optimal (type 3, 86 leaves, 6 steps):

$$-\frac{2\sqrt{c-\frac{c}{a x}}\sqrt{1+a x}}{\sqrt{1-a x}}+\frac{2\sqrt{a}\sqrt{c-\frac{c}{a x}}\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\sqrt{x}\right]}{\sqrt{1-a x}}$$

Result (type 3, 105 leaves):

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

Problem 582: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\,x^3\,dx$$

Optimal (type 3, 292 leaves, 11 steps):

$$-\frac{107\sqrt{c-\frac{c}{a x}}\,x\sqrt{1+a x}}{64 a^3\sqrt{1-a x}}-\frac{21\sqrt{c-\frac{c}{a x}}\,x\,(1+a x)^{3/2}}{32 a^3\sqrt{1-a x}}-\frac{11\sqrt{c-\frac{c}{a x}}\,x^2\,(1+a x)^{3/2}}{24 a^2\sqrt{1-a x}}-\frac{\sqrt{c-\frac{c}{a x}}\,x^3\,(1+a x)^{3/2}}{4 a\sqrt{1-a x}}-\frac{363\sqrt{c-\frac{c}{a x}}\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\sqrt{x}\right]}{64 a^{7/2}\sqrt{1-a x}}+\frac{4\sqrt{2}\sqrt{c-\frac{c}{a x}}\sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{2}\sqrt{a}\sqrt{x}}{\sqrt{1+a x}}\right]}{a^{7/2}\sqrt{1-a x}}$$

Result (type 3, 231 leaves):

$$\frac{1}{384 a^4}\left(\frac{2 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}\,\left(447+214 a x+136 a^2 x^2+48 a^3 x^3\right)}{-1+a x}-1089\,i\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}}{-1+a x}\right]+768\,i\sqrt{2}\sqrt{c}\,\text{Log}\left[\frac{i a^4\left(4 i a\sqrt{c-\frac{c}{a x}}\,x\sqrt{1-a^2 x^2}+\sqrt{2}\sqrt{c}\,\left(-1-2 a x+3 a^2 x^2\right)\right)}{8 c\,(-1+a x)^2}\right]\right)$$

Problem 583: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\;x^2\,dx$$

Optimal (type 3, 248 leaves, 10 steps):

$$-\frac{13\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1+a\,x}}{8\,a^2\,\sqrt{1-a\,x}}-\frac{3\,\sqrt{c-\frac{c}{a\,x}}\;x\,(1+a\,x)^{3/2}}{4\,a^2\,\sqrt{1-a\,x}}-\frac{\sqrt{c-\frac{c}{a\,x}}\;x^2\,(1+a\,x)^{3/2}}{3\,a\,\sqrt{1-a\,x}}-\frac{45\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{8\,a^{5/2}\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{a^{5/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 223 leaves):

$$\frac{1}{48\,a^3}\left(\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\,\left(57+26\,a\,x+8\,a^2\,x^2\right)}{-1+a\,x}-135\,i\,\sqrt{c}\;\text{Log}\left[-i\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]+96\,i\,\sqrt{2}\,\sqrt{c}\;\text{Log}\left[\frac{i\,a^3\,\left(4\,i\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}+\sqrt{2}\,\sqrt{c}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)\right)}{8\,c\,\left(-1+a\,x\right)^2}\right]\right)$$

Problem 584: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\;x\,dx$$

Optimal (type 3, 204 leaves, 9 steps):

$$-\frac{7\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1+a\,x}}{4\,a\,\sqrt{1-a\,x}}-\frac{\sqrt{c-\frac{c}{a\,x}}\;x\,(1+a\,x)^{3/2}}{2\,a\,\sqrt{1-a\,x}}-\frac{23\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{4\,a^{3/2}\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\text{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{a^{3/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 211 leaves):

$$\frac{1}{8 a^2}\left(\frac{2 a \sqrt{c-\frac{c}{a x}}\, x\, (9+2 a x) \sqrt{1-a^2 x^2}}{-1+a x}-23\, i \sqrt{c}\, \text{Log}\left[-i \sqrt{c}\, (1+2 a x)+\frac{2 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}}{-1+a x}\right]+16\, i \sqrt{2} \sqrt{c}\, \text{Log}\left[\frac{-4 a \sqrt{c-\frac{c}{a x}}\, x \sqrt{1-a^2 x^2}+i \sqrt{2} \sqrt{c}\, \left(-1-2 a x+3 a^2 x^2\right)}{8 c\, (-1+a x)^2}\right]\right)$$

Problem 585: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{3 \text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}}\, dx$$

Optimal (type 3, 155 leaves, 8 steps):

$$-\frac{\sqrt{c-\frac{c}{a x}}\, x \sqrt{1+a x}}{\sqrt{1-a x}}-\frac{5 \sqrt{c-\frac{c}{a x}} \sqrt{x}\, \text{ArcSinh}\left[\sqrt{a} \sqrt{x}\right]}{\sqrt{a} \sqrt{1-a x}}+\frac{4 \sqrt{2} \sqrt{c-\frac{c}{a x}} \sqrt{x}\, \text{ArcTanh}\left[\frac{\sqrt{2} \sqrt{a} \sqrt{x}}{\sqrt{1+a x}}\right]}{\sqrt{a} \sqrt{1-a x}}$$

Result (type 3, 204 leaves):

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

Problem 586: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{3 \text{ArcTanh}[a x]} \sqrt{c-\frac{c}{a x}}}{x}\, dx$$

Optimal (type 3, 154 leaves, 8 steps):

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

Result (type 3, 196 leaves):

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

Problem 587: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x^2}\,dx$$

Optimal (type 3, 147 leaves, 6 steps):

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

Result (type 3, 145 leaves):

$$\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,\left(1+7\,a\,x\right)\,\sqrt{1-a^2\,x^2}}{3\,x\,\left(-1+a\,x\right)}+2\,i\,\sqrt{2}\,a\,\sqrt{c}\,\text{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+i\,\sqrt{2}\,\sqrt{c}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,a\,c\,\left(-1+a\,x\right)^2}\right]$$

Problem 588: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{3\,\text{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x^3}\,dx$$

Optimal (type 3, 191 leaves, 7 steps):

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

Result (type 3, 155 leaves):

$$\frac{2\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1-a^2\,x^2}\;\left(3+11\,a\,x+38\,a^2\,x^2\right)}{15\,x^2\,\left(-1+a\,x\right)}+2\,\mathrm{i}\,\sqrt{2}\;a^2\,\sqrt{c}\;\mathrm{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\;+\mathrm{i}\,\sqrt{2}\;\sqrt{c}\;\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,a^2\,c\,\left(-1+a\,x\right)^2}\right]$$

Problem 589: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{3\,\mathrm{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x^4}\,dx$$

Optimal (type 3, 237 leaves, 9 steps):

$$-\frac{104\,a^3\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{21\,\sqrt{1-a\,x}}-\frac{2\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{7\,x^3\,\sqrt{1-a\,x}}-\frac{6\,a\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{7\,x^2\,\sqrt{1-a\,x}}-\frac{32\,a^2\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{21\,x\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\;a^{7/2}\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\mathrm{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{1-a\,x}}$$

Result (type 3, 163 leaves):

$$\frac{2\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1-a^2\,x^2}\;\left(3+9\,a\,x+16\,a^2\,x^2+52\,a^3\,x^3\right)}{21\,x^3\,\left(-1+a\,x\right)}+2\,\mathrm{i}\,\sqrt{2}\;a^3\,\sqrt{c}\;\mathrm{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\;x\,\sqrt{1-a^2\,x^2}\;+\mathrm{i}\,\sqrt{2}\;\sqrt{c}\;\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,a^3\,c\,\left(-1+a\,x\right)^2}\right]$$

Problem 590: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{e^{3\,\mathrm{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}}{x^5}\,dx$$

Optimal (type 3, 281 leaves, 10 steps):

$$-\frac{1576\,a^4\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{315\,\sqrt{1-a\,x}}-\frac{2\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{9\,x^4\,\sqrt{1-a\,x}}-\frac{38\,a\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{63\,x^3\,\sqrt{1-a\,x}}-$$

$$\frac{92\,a^2\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{105\,x^2\,\sqrt{1-a\,x}}-\frac{472\,a^3\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{1+a\,x}}{315\,x\,\sqrt{1-a\,x}}+\frac{4\,\sqrt{2}\;a^{9/2}\,\sqrt{c-\frac{c}{a\,x}}\;\sqrt{x}\;\mathrm{ArcTanh}\left[\frac{\sqrt{2}\,\sqrt{a}\,\sqrt{x}}{\sqrt{1+a\,x}}\right]}{\sqrt{1-a\,x}}$$

Result (type 3, 171 leaves):

$$\frac{2\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}\,\left(35+95\,a\,x+138\,a^2\,x^2+236\,a^3\,x^3+788\,a^4\,x^4\right)}{315\,x^4\,\left(-1+a\,x\right)}+2\,\mathrm{i}\,\sqrt{2}\,a^4\,\sqrt{c}\,\mathrm{Log}\left[\frac{-4\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}+\mathrm{i}\,\sqrt{2}\,\sqrt{c}\,\left(-1-2\,a\,x+3\,a^2\,x^2\right)}{8\,a^4\,c\,\left(-1+a\,x\right)^2}\right]$$

Problem 592: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\mathrm{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\,x^2\,dx$$

Optimal (type 3, 182 leaves, 8 steps):

$$-\frac{11\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1+a\,x}}{8\,a^2\,\sqrt{1-a\,x}}+\frac{11\,\sqrt{c-\frac{c}{a\,x}}\,x^2\,\sqrt{1+a\,x}}{12\,a\,\sqrt{1-a\,x}}-\frac{\sqrt{c-\frac{c}{a\,x}}\,x^3\,\sqrt{1-a^2\,x^2}}{3\,\left(1-a\,x\right)}+\frac{11\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\mathrm{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{8\,a^{5/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 128 leaves):

$$\frac{\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}\,\left(33-22\,a\,x+8\,a^2\,x^2\right)}{-1+a\,x}+33\,\mathrm{i}\,\sqrt{c}\,\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{48\,a^3}$$

Problem 593: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\mathrm{ArcTanh}[a\,x]}\,\sqrt{c-\frac{c}{a\,x}}\,x\,dx$$

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

$$\frac{7\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1+a\,x}}{4\,a\,\sqrt{1-a\,x}}-\frac{\sqrt{c-\frac{c}{a\,x}}\,x^2\,\sqrt{1-a^2\,x^2}}{2\,\left(1-a\,x\right)}-\frac{7\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\mathrm{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{4\,a^{3/2}\,\sqrt{1-a\,x}}$$

Result (type 3, 120 leaves):

$$\frac{\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\left(-7+2\,a\,x\right)\,\sqrt{1-a^2\,x^2}}{-1+a\,x}-7\,\mathrm{i}\,\sqrt{c}\,\mathrm{Log}\left[-\mathrm{i}\,\sqrt{c}\,\left(1+2\,a\,x\right)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\right]}{8\,a^2}$$

Problem 594: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}\,dx$$

Optimal (type 3, 90 leaves, 6 steps):

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

Result (type 3, 110 leaves):

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

Problem 595: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}}{x}\,dx$$

Optimal (type 3, 89 leaves, 6 steps):

$$-\frac{2\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{1-a^2\,x^2}}{1-a\,x}-\frac{2\,\sqrt{a}\,\sqrt{c-\frac{c}{a\,x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{1-a\,x}}$$

Result (type 3, 105 leaves):

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

Problem 608: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\sqrt{c-\frac{c}{a\,x}}\,x^3\,dx$$

Optimal (type 3, 262 leaves, 9 steps):

$$\frac{8\sqrt{c-\frac{c}{a x}}\, x^4}{\sqrt{1-a x}\,\sqrt{1+a x}}-\frac{1115\sqrt{c-\frac{c}{a x}}\, x\,\sqrt{1+a x}}{64 a^3\sqrt{1-a x}}+\frac{1115\sqrt{c-\frac{c}{a x}}\, x^2\,\sqrt{1+a x}}{96 a^2\sqrt{1-a x}}-\frac{223\sqrt{c-\frac{c}{a x}}\, x^3\,\sqrt{1+a x}}{24 a\sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\, x^4\,\sqrt{1+a x}}{4\sqrt{1-a x}}+\frac{1115\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{64 a^{7/2}\sqrt{1-a x}}$$

Result (type 3, 137 leaves):

$$\frac{\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\left(-3345-1115 a x+446 a^2 x^2-200 a^3 x^3+48 a^4 x^4\right)}{\sqrt{1-a^2 x^2}}+3345\, i\,\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{384 a^4}$$

Problem 609: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\, x^2\, dx$$

Optimal (type 3, 218 leaves, 8 steps):

$$\frac{8\sqrt{c-\frac{c}{a x}}\, x^3}{\sqrt{1-a x}\,\sqrt{1+a x}}+\frac{119\sqrt{c-\frac{c}{a x}}\, x\,\sqrt{1+a x}}{8 a^2\sqrt{1-a x}}-\frac{119\sqrt{c-\frac{c}{a x}}\, x^2\,\sqrt{1+a x}}{12 a\sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\, x^3\,\sqrt{1+a x}}{3\sqrt{1-a x}}-\frac{119\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{8 a^{5/2}\sqrt{1-a x}}$$

Result (type 3, 129 leaves):

$$\frac{\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\left(357+119 a x-38 a^2 x^2+8 a^3 x^3\right)}{\sqrt{1-a^2 x^2}}-357\, i\,\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,(1+2 a x)+\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{48 a^3}$$

Problem 610: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\, x\, dx$$

Optimal (type 3, 174 leaves, 7 steps):

$$\frac{8\sqrt{c-\frac{c}{a x}}\, x^2}{\sqrt{1-a x}\,\sqrt{1+a x}}-\frac{47\sqrt{c-\frac{c}{a x}}\, x\sqrt{1+a x}}{4 a\sqrt{1-a x}}+\frac{\sqrt{c-\frac{c}{a x}}\, x^2\sqrt{1+a x}}{2\sqrt{1-a x}}+\frac{47\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{4 a^{3/2}\sqrt{1-a x}}$$

Result (type 3, 121 leaves):

$$\frac{\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\left(-47-13 a x+2 a^2 x^2\right)}{\sqrt{1-a^2 x^2}}+47\, i\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,\left(1+2 a x\right)+\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{8 a^2}$$

Problem 611: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{-3\,\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}\, dx$$

Optimal (type 3, 123 leaves, 6 steps):

$$\frac{8\sqrt{c-\frac{c}{a x}}\, x}{\sqrt{1-a x}\,\sqrt{1+a x}}+\frac{\sqrt{c-\frac{c}{a x}}\, x\sqrt{1+a x}}{\sqrt{1-a x}}-\frac{7\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{a}\,\sqrt{1-a x}}$$

Result (type 3, 108 leaves):

$$\frac{\sqrt{c-\frac{c}{a x}}\, x\left(9+a x\right)}{\sqrt{1-a^2 x^2}}-\frac{7\, i\sqrt{c}\,\text{Log}\left[-i\sqrt{c}\,\left(1+2 a x\right)+\frac{2 a\sqrt{c-\frac{c}{a x}}\, x\sqrt{1-a^2 x^2}}{-1+a x}\right]}{2 a}$$

Problem 612: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{-3\,\text{ArcTanh}[a x]}\sqrt{c-\frac{c}{a x}}}{x}\, dx$$

Optimal (type 3, 124 leaves, 6 steps):

$$-\frac{2\sqrt{c-\frac{c}{a x}}}{\sqrt{1-a x}\,\sqrt{1+a x}}-\frac{10 a\sqrt{c-\frac{c}{a x}}\, x}{\sqrt{1-a x}\,\sqrt{1+a x}}+\frac{2\sqrt{a}\,\sqrt{c-\frac{c}{a x}}\,\sqrt{x}\,\text{ArcSinh}\left[\sqrt{a}\,\sqrt{x}\right]}{\sqrt{1-a x}}$$

Result (type 3, 104 leaves):

$$-\frac{2\sqrt{c-\frac{c}{a\,x}}\,(1+5\,a\,x)}{\sqrt{1-a^2\,x^2}}+\mathrm{i}\,\sqrt{c}\;\mathrm{Log}\Big[-\mathrm{i}\,\sqrt{c}\,\,(1+2\,a\,x)+\frac{2\,a\,\sqrt{c-\frac{c}{a\,x}}\,\,x\,\sqrt{1-a^2\,x^2}}{-1+a\,x}\Big]$$

Problem 617: Unable to integrate problem.

$$\int e^{n\,\mathrm{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Optimal (type 6, 64 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a\,x}\right)^p\,x\,(1-a\,x)^{-p}\,\mathrm{AppellF1}\left[1-p,\,\frac{1}{2}\,(n-2\,p),\,-\frac{n}{2},\,2-p,\,a\,x,\,-a\,x\right]}{1-p}$$

Result (type 8, 24 leaves):

$$\int e^{n\,\mathrm{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Problem 618: Unable to integrate problem.

$$\int e^{-2\,p\,\mathrm{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Optimal (type 6, 54 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a\,x}\right)^p\,x\,(1-a\,x)^{-p}\,\mathrm{AppellF1}\left[1-p,\,-2\,p,\,p,\,2-p,\,a\,x,\,-a\,x\right]}{1-p}$$

Result (type 8, 25 leaves):

$$\int e^{-2\,p\,\mathrm{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Problem 619: Unable to integrate problem.

$$\int e^{2\,p\,\mathrm{ArcTanh}[a\,x]}\,\left(c-\frac{c}{a\,x}\right)^p\,dx$$

Optimal (type 5, 50 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a\,x}\right)^p\,x\,(1-a\,x)^{-p}\,\mathrm{Hypergeometric2F1}\left[1-p,\,-p,\,2-p,\,-a\,x\right]}{1-p}$$

Result (type 8, 25 leaves):

$$\int e^{2\,p\,\text{ArcTanh}[a\,x]} \left(c-\frac{c}{a\,x}\right)^p dx$$

Problem 624: Attempted integration timed out after 120 seconds.

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

Optimal (type 6, 54 leaves, 3 steps):

$$-\frac{2\left(c-\frac{c}{a\,x}\right)^{3/2} x\,\text{AppellF1}\left[-\frac{1}{2},\frac{1}{2}(-3+n),-\frac{n}{2},\frac{1}{2},a\,x,-a\,x\right]}{(1-a\,x)^{3/2}}$$

Result (type 1, 1 leaves):

???

Problem 625: Attempted integration timed out after 120 seconds.

$$\int e^{n\,\text{ArcTanh}[a\,x]} \sqrt{c-\frac{c}{a\,x}}\, dx$$

Optimal (type 6, 54 leaves, 3 steps):

$$\frac{2\sqrt{c-\frac{c}{a\,x}}\, x\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+n),-\frac{n}{2},\frac{3}{2},a\,x,-a\,x\right]}{\sqrt{1-a\,x}}$$

Result (type 1, 1 leaves):

???

Problem 626: Attempted integration timed out after 120 seconds.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}}{\sqrt{c-\frac{c}{a\,x}}} dx$$

Optimal (type 6, 56 leaves, 3 steps):

$$\frac{2\,x\,\sqrt{1-a\,x}\;\text{AppellF1}\left[\frac{3}{2},\frac{1+n}{2},-\frac{n}{2},\frac{5}{2},a\,x,-a\,x\right]}{3\,\sqrt{c-\frac{c}{a\,x}}}$$

Result (type 1, 1 leaves):

???

Problem 627: Attempted integration timed out after 120 seconds.

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

Optimal (type 6, 56 leaves, 3 steps):

$$\frac{2\,x\,(1-a\,x)^{3/2}\;\text{AppellF1}\left[\frac{5}{2},\frac{3+n}{2},-\frac{n}{2},\frac{7}{2},a\,x,-a\,x\right]}{5\,\left(c-\frac{c}{a\,x}\right)^{3/2}}$$

Result (type 1, 1 leaves):

???

Problem 789: Unable to integrate problem.

$$\int e^{-2\,p\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a^2\,x^2}\right)^p dx$$

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

$$\frac{\left(c-\frac{c}{a^2\,x^2}\right)^p x\,\left(1-a^2\,x^2\right)^{-p}\,\text{Hypergeometric2F1}[1-2\,p,-2\,p,2-2\,p,a\,x]}{1-2\,p}$$

Result (type 8, 25 leaves):

$$\int e^{-2\,p\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a^2\,x^2}\right)^p dx$$

Problem 790: Unable to integrate problem.

$$\int e^{2\,p\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a^2\,x^2}\right)^p dx$$

Optimal (type 5, 54 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[1-2 p,-2 p,2-2 p,-a x\right]}{1-2 p}$$

Result (type 8, 25 leaves):

$$\int e^{2 p \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 800: Unable to integrate problem.

$$\int e^{n \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 6, 72 leaves, 3 steps):

$$\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p} \text{AppellF1}\left[1-2 p,\frac{1}{2} (n-2 p),-\frac{n}{2}-p,2-2 p,a x,-a x\right]}{1-2 p}$$

Result (type 8, 24 leaves):

$$\int e^{n \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 801: Result unnecessarily involves higher level functions.

$$\int e^{4 \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 339 leaves, 13 steps):

$$\frac{2 a \left(c-\frac{c}{a^2 x^2}\right)^p x^2}{(1-p) (1-a x) (1+a x)}+\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2} (1-2 p),2-p,\frac{1}{2} (3-2 p),a^2 x^2\right]}{1-2 p}+$$
$$\frac{6 a^2 \left(c-\frac{c}{a^2 x^2}\right)^p x^3 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2} (3-2 p),2-p,\frac{1}{2} (5-2 p),a^2 x^2\right]}{3-2 p}+$$
$$\frac{a^4 \left(c-\frac{c}{a^2 x^2}\right)^p x^5 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2} (5-2 p),2-p,\frac{1}{2} (7-2 p),a^2 x^2\right]}{5-2 p}+$$
$$\frac{2 a^3 \left(c-\frac{c}{a^2 x^2}\right)^p x^4 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[2-p,2-p,3-p,a^2 x^2\right]}{2-p}$$

Result (type 6, 319 leaves):

$$\left(c-\frac{c}{a^2 x^2}\right)^p x \left(\frac{1}{1-2p}\left(4 (-1+a x)^p \left(\frac{1-a x}{1+a x}\right)^{-p} (1+a x)^{-1+p} (-1+a^2 x^2)^{-p} \text{Hypergeometric2F1}\left[1-2p, 2-p, 2-2p, \frac{2 a x}{1+a x}\right] + (1-a^2 x^2)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p, -p, \frac{3}{2}-p, a^2 x^2\right]\right) - \left(8 (-1+p) (1-a x)^{-p} (-1+a x)^{-1+p} (1-a^2 x^2)^p (-1+a^2 x^2)^{-p} \text{AppellF1}[1-2p, 1-p, -p, 2-2p, a x, -a x]\right) \Big/ \left((-1+2p) \left(2 (-1+p) \text{AppellF1}[1-2p, 1-p, -p, 2-2p, a x, -a x] + a x \left((-1+p) \text{AppellF1}[2-2p, 2-p, -p, 3-2p, a x, -a x] - p \text{HypergeometricPFQ}[\{1-p, 1-p\}, \{2-p\}, a^2 x^2]\right)\right)\right)\right)$$

Problem 802: Unable to integrate problem.

$$\int e^{3 \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 217 leaves, 7 steps):

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

Result (type 8, 24 leaves):

$$\int e^{3 \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 803: Result unnecessarily involves higher level functions.

$$\int e^{2 \text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 217 leaves, 10 steps):

$$\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(1-2p), 1-p, \frac{1}{2}(3-2p), a^2 x^2\right]}{1-2p} + \frac{a^2 \left(c-\frac{c}{a^2 x^2}\right)^p x^3 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(3-2p), 1-p, \frac{1}{2}(5-2p), a^2 x^2\right]}{3-2p} + \frac{a \left(c-\frac{c}{a^2 x^2}\right)^p x^2 (1-a x)^{-p} (1+a x)^{-p} \text{Hypergeometric2F1}\left[1-p, 1-p, 2-p, a^2 x^2\right]}{1-p}$$

Result (type 6, 235 leaves):

$$\frac{1}{-1+2p}\left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p} \left(\text{Hypergeometric2F1}\left[\frac{1}{2}-p,-p,\frac{3}{2}-p,a^2 x^2\right]+\left(4 (-1+p) (1-a x)^{-p} (-1+a x)^{-1+p} \left(1-a^2 x^2\right)^{2p} \left(-1+a^2 x^2\right)^{-p} \text{AppellF1}[1-2p,1-p,-p,2-2p,a x,-a x]\right)\Big/\left(2 (-1+p) \text{AppellF1}[1-2p,1-p,-p,2-2p,a x,-a x]+a x \left((-1+p) \text{AppellF1}[2-2p,2-p,-p,3-2p,a x,-a x]-p\,\text{HypergeometricPFQ}\left[\{1-p,1-p\},\{2-p\},a^2 x^2\right]\right)\right)\right)$$

Problem 804: Unable to integrate problem.

$$\int e^{\text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 137 leaves, 5 steps):

$$\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(1-2p),\frac{1}{2}-p,\frac{1}{2}(3-2p),a^2 x^2\right]}{1-2p}+\frac{a \left(c-\frac{c}{a^2 x^2}\right)^p x^2 \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p,1-p,2-p,a^2 x^2\right]}{2(1-p)}$$

Result (type 8, 22 leaves):

$$\int e^{\text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 805: Unable to integrate problem.

$$\int e^{-\text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Optimal (type 5, 137 leaves, 5 steps):

$$\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(1-2p),\frac{1}{2}-p,\frac{1}{2}(3-2p),a^2 x^2\right]}{1-2p}-\frac{a \left(c-\frac{c}{a^2 x^2}\right)^p x^2 \left(1-a^2 x^2\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p,1-p,2-p,a^2 x^2\right]}{2(1-p)}$$

Result (type 8, 24 leaves):

$$\int e^{-\text{ArcTanh}[a x]} \left(c-\frac{c}{a^2 x^2}\right)^p dx$$

Problem 806: Result unnecessarily involves higher level functions.

$$\int e^{-2\,\text{ArcTanh}[a\,x]}\left(c-\frac{c}{a^2\,x^2}\right)^p\,dx$$

Optimal (type 5, 218 leaves, 10 steps):

$$\frac{\left(c-\frac{c}{a^2 x^2}\right)^p x\,(1-a\,x)^{-p}\,(1+a\,x)^{-p}\,\text{Hypergeometric2F1}\left[\frac{1}{2}\,(1-2\,p),\,1-p,\,\frac{1}{2}\,(3-2\,p),\,a^2\,x^2\right]}{1-2\,p}+\frac{a^2\left(c-\frac{c}{a^2 x^2}\right)^p x^3\,(1-a\,x)^{-p}\,(1+a\,x)^{-p}\,\text{Hypergeometric2F1}\left[\frac{1}{2}\,(3-2\,p),\,1-p,\,\frac{1}{2}\,(5-2\,p),\,a^2\,x^2\right]}{3-2\,p}-\frac{a\left(c-\frac{c}{a^2 x^2}\right)^p x^2\,(1-a\,x)^{-p}\,(1+a\,x)^{-p}\,\text{Hypergeometric2F1}\left[1-p,\,1-p,\,2-p,\,a^2\,x^2\right]}{1-p}$$

Result (type 6, 226 leaves):

$$\left(c-\frac{c}{a^2\,x^2}\right)^p x\left(\frac{\left(1-a^2\,x^2\right)^{-p}\,\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\,-p,\,\frac{3}{2}-p,\,a^2\,x^2\right]}{-1+2\,p}+\left(4\,(-1+p)\,(-1+a\,x)^p\,(1+a\,x)^{-1+p}\,\left(-1+a^2\,x^2\right)^{-p}\,\text{AppellF1}[1-2\,p,\,-p,\,1-p,\,2-2\,p,\,a\,x,\,-a\,x]\right)\Big/\left((1-2\,p)\,\left(2\,(-1+p)\,\text{AppellF1}[1-2\,p,\,-p,\,1-p,\,2-2\,p,\,a\,x,\,-a\,x]+a\,x\,\left(-(-1+p)\,\text{AppellF1}[2-2\,p,\,-p,\,2-p,\,3-2\,p,\,a\,x,\,-a\,x]+p\,\text{HypergeometricPFQ}\left[\{1-p,\,1-p\},\,\{2-p\},\,a^2\,x^2\right]\right)\right)\right)\right)$$

Problem 807: Unable to integrate problem.

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

Optimal (type 5, 216 leaves, 7 steps):

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

Result (type 8, 24 leaves):

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

Problem 808: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,x\,\sqrt{1+x}\,\text{Sin}[x]\,dx$$

Optimal (type 4, 240 leaves, 16 steps):

$$3\sqrt{1-x}\,\text{Cos}[x]-(1-x)^{3/2}\,\text{Cos}[x]-3\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+2\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-2\sqrt{2\pi}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-3\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-\frac{3}{2}\sqrt{1-x}\,\text{Sin}[x]$$

Result (type 4, 185 leaves):

$$\frac{1}{8\sqrt{1-x^2}}\,i\,\sqrt{1+x}\left((-11-i)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[1]+i\,\text{Sin}[1])+\left((-4-3\,i)+(2+3\,i)\,x+2\,x^2\right)(2\,i\,\text{Cos}[x]-2\,\text{Sin}[x])+\left(2\left((-3-4\,i)+(3+2\,i)\,x+2\,i\,x^2\right)(\text{Cos}[1]+i\,\text{Sin}[1])-(1+11\,i)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[x]+i\,\text{Sin}[x])\right)(\text{Cos}[1+x]-i\,\text{Sin}[1+x])\right)$$

Problem 809: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,\sqrt{1+x}\,\text{Sin}[x]\,dx$$

Optimal (type 4, 141 leaves, 11 steps):

$$\sqrt{1-x}\ \text{Cos}[x]-\sqrt{\frac{\pi}{2}}\ \text{Cos}[1]\ \text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\ \sqrt{1-x}\right]+2\sqrt{2\pi}\ \text{Cos}[1]\ \text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\ \sqrt{1-x}\right]-$$

$$2\sqrt{2\pi}\ \text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\ \sqrt{1-x}\right]\text{Sin}[1]-\sqrt{\frac{\pi}{2}}\ \text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\ \sqrt{1-x}\right]\text{Sin}[1]$$

Result (type 4, 129 leaves):

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

Problem 810: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\ \sqrt{1-x}\ x\,\text{Sin}[x]\,dx$$

Optimal (type 4, 163 leaves, 13 steps):

$$\sqrt{1+x}\ \text{Cos}[x]-(1+x)^{3/2}\ \text{Cos}[x]-\sqrt{\frac{\pi}{2}}\ \text{Cos}[1]\ \text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\ \sqrt{1+x}\right]-\frac{3}{2}\sqrt{\frac{\pi}{2}}\ \text{Cos}[1]\ \text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\ \sqrt{1+x}\right]+$$

$$\frac{3}{2}\sqrt{\frac{\pi}{2}}\ \text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\ \sqrt{1+x}\right]\text{Sin}[1]-\sqrt{\frac{\pi}{2}}\ \text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\ \sqrt{1+x}\right]\text{Sin}[1]+\frac{3}{2}\sqrt{1+x}\ \text{Sin}[x]$$

Result (type 4, 168 leaves):

$$\frac{1}{\sqrt{1-x^2}}\left(\frac{1}{16}+\frac{i}{16}\right)e^{-i\ (1+x)}\ \sqrt{1-x}\ \left((-3-2\,i)\ e^{i\,x}\ \sqrt{2\pi}\ \sqrt{-1-x}\ \text{Erf}\left[\frac{(1+i)\ \sqrt{-1-x}}{\sqrt{2}}\right]+\right.$$

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

Problem 811: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\ \sqrt{1-x}\ \text{Sin}[x]\,dx$$

Optimal (type 4, 72 leaves, 7 steps):

$$-\sqrt{1+x}\,\text{Cos}[x]+\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]+\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1]$$

Result (type 4, 138 leaves) :

$$-\frac{1}{4\sqrt{-1-x}\,\sqrt{1-x}}\,e^{-i(1+x)}\sqrt{1-x^2}\left(2\,e^{i}\left(1+e^{2ix}\right)\sqrt{-1-x}+(-1)^{3/4}\,e^{i(2+x)}\sqrt{\pi}\,\text{Erfi}\left[(-1)^{1/4}\sqrt{-1-x}\right]+(-1)^{1/4}\,e^{ix}\sqrt{\pi}\,\text{Erfi}\left[(-1)^{3/4}\sqrt{-1-x}\right]\right)$$

Problem 812: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,x\,(1+x)^{3/2}\,\text{Sin}[x]\,dx$$

Optimal (type 4, 335 leaves, 22 steps) :

$$\frac{17}{4}\sqrt{1-x}\,\text{Cos}[x]-5\,(1-x)^{3/2}\,\text{Cos}[x]+(1-x)^{5/2}\,\text{Cos}[x]+\frac{15}{4}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-$$
$$4\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-\frac{15}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+$$
$$4\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+\frac{15}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-4\sqrt{2\pi}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]+$$
$$\frac{15}{4}\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-4\sqrt{2\pi}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-\frac{15}{2}\sqrt{1-x}\,\text{Sin}[x]+\frac{5}{2}\,(1-x)^{3/2}\,\text{Sin}[x]$$

Result (type 4, 201 leaves) :

$$\frac{1}{\sqrt{1-x^2}}\left(\frac{1}{32}+\frac{i}{32}\right)\sqrt{1+x}$$
$$\left((-2-17\,i)\sqrt{2\pi}\,\sqrt{-1+x}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[1]+i\,\text{Sin}[1])-(2-2\,i)\left((-1-20\,i)-(11-10\,i)\,x+(8+10\,i)\,x^2+4\,x^3\right)\right.$$
$$(\text{Cos}[x]+i\,\text{Sin}[x])-(1+i)\left(2\left((-1+20\,i)-(11+10\,i)\,x+(8-10\,i)\,x^2+4\,x^3\right)(-i\,\text{Cos}[1]+\text{Sin}[1])+\right.$$
$$\left.\left.(15+19\,i)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[x]+i\,\text{Sin}[x])\right)(\text{Cos}[1+x]-i\,\text{Sin}[1+x])\right)$$

Problem 813: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,(1+x)^{3/2}\,\text{Sin}[x]\,dx$$

Optimal (type 4, 236 leaves, 16 steps):

$$4\sqrt{1-x}\,\text{Cos}[x]-(1-x)^{3/2}\,\text{Cos}[x]-2\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]-$$
$$\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+4\sqrt{2\pi}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]+\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-$$
$$4\sqrt{2\pi}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-2\sqrt{2\pi}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1-x}\right]\text{Sin}[1]-\frac{3}{2}\sqrt{1-x}\,\text{Sin}[x]$$

Result (type 4, 178 leaves):

$$\frac{1}{8\sqrt{-1+x}\,\sqrt{1+x}}\sqrt{1-x^2}\left((5+21\,i)\sqrt{\frac{\pi}{2}}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[1]+i\,\text{Sin}[1])+2\sqrt{-1+x}\,\left((6+3\,i)+2\,x\right)(\text{Cos}[x]+i\,\text{Sin}[x])-\right.$$
$$\left.i\left(2\left((3+6\,i)+2\,i\,x\right)\sqrt{-1+x}\,(\text{Cos}[1]+i\,\text{Sin}[1])+(21+5\,i)\sqrt{\frac{\pi}{2}}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](-i\,\text{Cos}[x]+\text{Sin}[x])\right)(\text{Cos}[1+x]-i\,\text{Sin}[1+x])\right)$$

Problem 814: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,(1-x)^{3/2}\,x\,\text{Sin}[x]\,dx$$

Optimal (type 4, 193 leaves, 19 steps):

$$-\frac{7}{4}\sqrt{1+x}\,\text{Cos}[x]-3\,(1+x)^{3/2}\,\text{Cos}[x]+(1+x)^{5/2}\,\text{Cos}[x]+\frac{7}{4}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]-\frac{9}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]+$$
$$\frac{9}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1]+\frac{7}{4}\sqrt{\frac{\pi}{2}}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1]+\frac{9}{2}\sqrt{1+x}\,\text{Sin}[x]-\frac{5}{2}(1+x)^{3/2}\,\text{Sin}[x]$$

Result (type 4, 215 leaves):

$$\frac{1}{16\sqrt{1-x^2}}$$
$$\sqrt{1-x}\,\Big(e^{-i}\Big((18-7\,i)\sqrt{\pi}\,\sqrt{-i\,(1+x)}+2\,e^{i\,(1+x)}\left((-15-8\,i)-(19-2\,i)\,x+10\,i\,x^2+4\,x^3\right)-(18-7\,i)\sqrt{\pi}\,\sqrt{-i\,(1+x)}\,\text{Erf}\left[\sqrt{-i\,(1+x)}\right]\Big)+$$
$$e^{-i\,x}\Big((-30+16\,i)-(38+4\,i)\,x-20\,i\,x^2+8\,x^3+(18+7\,i)\,e^{i\,(1+x)}\sqrt{\pi}\,\sqrt{i\,(1+x)}-(18+7\,i)\,e^{i\,(1+x)}\sqrt{\pi}\,\sqrt{i\,(1+x)}\,\text{Erf}\left[\sqrt{i\,(1+x)}\right]\Big)\Big)$$

Problem 815: Result unnecessarily involves imaginary or complex numbers.

$$\int e^{\text{ArcTanh}[x]}\,(1-x)^{3/2}\,\text{Sin}[x]\,dx$$

Optimal (type 4, 157 leaves, 13 steps):

$$-2\sqrt{1+x}\,\text{Cos}[x]+(1+x)^{3/2}\,\text{Cos}[x]+\sqrt{2\,\pi}\,\text{Cos}[1]\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]+\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{Cos}[1]\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]-$$
$$\frac{3}{2}\sqrt{\frac{\pi}{2}}\,\text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1]+\sqrt{2\,\pi}\,\text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\,\sqrt{1+x}\right]\text{Sin}[1]-\frac{3}{2}\sqrt{1+x}\,\text{Sin}[x]$$

Result (type 4, 176 leaves):

$$\frac{1}{\sqrt{-1-x}\,\sqrt{1-x}}\left(\frac{1}{16}+\frac{i}{16}\right)e^{-i\,x}\sqrt{1-x^2}\,\Big((2+2\,i)\sqrt{-1-x}\,\left((-3+2\,i)+e^{2\,i\,x}\left((3+2\,i)-2\,i\,x\right)-2\,i\,x\right)-$$
$$(3+4\,i)\,e^{i\,x}\sqrt{2\,\pi}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1-x}}{\sqrt{2}}\right](\text{Cos}[1]-i\,\text{Sin}[1])+(4+3\,i)\,e^{i\,x}\sqrt{2\,\pi}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1-x}}{\sqrt{2}}\right](-i\,\text{Cos}[1]+\text{Sin}[1])\Big)$$

Problem 816: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[x]}\, x\, \text{Sin}[x]}{\sqrt{1+x}}\, dx$$

Optimal (type 4, 140 leaves, 11 steps):

$$\sqrt{1-x}\, \text{Cos}[x] - \sqrt{\frac{\pi}{2}}\, \text{Cos}[1]\, \text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\, \sqrt{1-x}\right] + \sqrt{2\pi}\, \text{Cos}[1]\, \text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\, \sqrt{1-x}\right] - \sqrt{2\pi}\, \text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\, \sqrt{1-x}\right] \text{Sin}[1] - \sqrt{\frac{\pi}{2}}\, \text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\, \sqrt{1-x}\right] \text{Sin}[1]$$

Result (type 4, 165 leaves):

$$\frac{1}{\sqrt{1-x^2}}\left(\frac{1}{8}+\frac{i}{8}\right)\sqrt{1+x}\left(\left(-2-i\right)\sqrt{2\pi}\,\sqrt{-1+x}\,\text{Erfi}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[1]+i\,\text{Sin}[1]) - (2-2i)(-1+x)(\text{Cos}[x]+i\,\text{Sin}[x]) - (1-i)\left(2(-1+x)(\text{Cos}[1]+i\,\text{Sin}[1]) - (3+i)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\text{Erf}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[x]+i\,\text{Sin}[x])\right)(\text{Cos}[1+x]-i\,\text{Sin}[1+x])\right)$$

Problem 817: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{e^{\text{ArcTanh}[x]}\, \text{Sin}[x]}{\sqrt{1+x}}\, dx$$

Optimal (type 4, 62 leaves, 6 steps):

$$\sqrt{2\pi}\, \text{Cos}[1]\, \text{FresnelS}\left[\sqrt{\frac{2}{\pi}}\, \sqrt{1-x}\right] - \sqrt{2\pi}\, \text{FresnelC}\left[\sqrt{\frac{2}{\pi}}\, \sqrt{1-x}\right] \text{Sin}[1]$$

Result (type 4, 98 leaves):

$$\frac{1}{\sqrt{1-x^2}}\left(\frac{1}{2}+\frac{i}{2}\right)\sqrt{\frac{\pi}{2}}\,\sqrt{-1+x}\,\sqrt{1+x}\left(\text{Erf}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[1]-i\,\text{Sin}[1]) - \text{Erfi}\left[\frac{(1+i)\sqrt{-1+x}}{\sqrt{2}}\right](\text{Cos}[1]+i\,\text{Sin}[1])\right)$$

Problem 872: Result unnecessarily involves higher level functions.

$$\int \frac{e^{\text{ArcTanh}[a+b\,x]}}{1-a^2-2\,a\,b\,x-b^2\,x^2}\, dx$$

Optimal (type 2, 27 leaves, 2 steps):

$$\frac{\sqrt{1+a+b\,x}}{b\,\sqrt{1-a-b\,x}}$$

Result (type 3, 12 leaves):

$$\frac{e^{\text{ArcTanh}[a+b\,x]}}{b}$$

Problem 875: Unable to integrate problem.

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

Optimal (type 6, 109 leaves, 4 steps):

$$\frac{x^{1+m}\,(1-a-b\,x)^{-n/2}\,(1+a+b\,x)^{n/2}\,\left(1-\frac{b\,x}{1-a}\right)^{n/2}\,\left(1+\frac{b\,x}{1+a}\right)^{-n/2}\,\text{AppellF1}\left[1+m,\frac{n}{2},-\frac{n}{2},2+m,\frac{b\,x}{1-a},-\frac{b\,x}{1+a}\right]}{1+m}$$

Result (type 8, 16 leaves):

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

Problem 880: Unable to integrate problem.

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

Optimal (type 5, 135 leaves, 5 steps):

$$\frac{2\,(1-a-b\,x)^{-n/2}\,(1+a+b\,x)^{n/2}\,\text{Hypergeometric2F1}\left[1,-\frac{n}{2},1-\frac{n}{2},\frac{(1+a)\,(1-a-b\,x)}{(1-a)\,(1+a+b\,x)}\right]}{n}-\frac{2^{1+\frac{n}{2}}\,(1-a-b\,x)^{-n/2}\,\text{Hypergeometric2F1}\left[-\frac{n}{2},-\frac{n}{2},1-\frac{n}{2},\frac{1}{2}\,(1-a-b\,x)\right]}{n}$$

Result (type 8, 16 leaves):

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

Problem 881: Unable to integrate problem.

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

Optimal (type 5, 92 leaves, 2 steps):

$$-\frac{4\,b\,(1-a-b\,x)^{1-\frac{n}{2}}\,(1+a+b\,x)^{\frac{1}{2}(-2+n)}\,\text{Hypergeometric2F1}\left[2,\,1-\frac{n}{2},\,2-\frac{n}{2},\,\frac{(1+a)\,(1-a-b\,x)}{(1-a)\,(1+a+b\,x)}\right]}{(1-a)^2\,(2-n)}$$

Result (type 8, 16 leaves):

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

Problem 882: Unable to integrate problem.

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

Optimal (type 5, 152 leaves, 3 steps):

$$-\frac{(1-a-b\,x)^{1-\frac{n}{2}}\,(1+a+b\,x)^{\frac{2+n}{2}}}{2\,(1-a^2)\,x^2}-\frac{2\,b^2\,(2\,a+n)\,(1-a-b\,x)^{1-\frac{n}{2}}\,(1+a+b\,x)^{\frac{1}{2}(-2+n)}\,\text{Hypergeometric2F1}\left[2,\,1-\frac{n}{2},\,2-\frac{n}{2},\,\frac{(1+a)\,(1-a-b\,x)}{(1-a)\,(1+a+b\,x)}\right]}{(1-a)^3\,(1+a)\,(2-n)}$$

Result (type 8, 16 leaves):

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

Problem 924: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 12 leaves, 2 steps):

$$-\frac{\text{Log}[1-a\,x]}{a}$$

Result (type 4, 52 leaves):

$$\frac{2\,i\,\sqrt{-a^2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]-a\,\text{Log}\left[-1+a^2\,x^2\right]}{2\,a^2}$$

Problem 961: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{e^{\text{ArcTanh}[a\,x]}}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

Optimal (type 3, 41 leaves, 3 steps):

$$-\frac{\sqrt{1-a^2\,x^2}\,\text{Log}[1-a\,x]}{a\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 87 leaves):

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

Problem 970: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 91 leaves, 5 steps):

$$\frac{\sqrt{1-a^2\,x^2}}{2\,a^2\,c\,(1-a\,x)\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}\,\text{ArcTanh}[a\,x]}{2\,a^2\,c\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 93 leaves):

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

Problem 971: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 91 leaves, 5 steps):

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

Result (type 4, 91 leaves):

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

Problem 972: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 165 leaves, 4 steps):

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

Result (type 4, 121 leaves):

$$\left(\sqrt{c-a^2 c x^2} \left(-i a (-1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\, x\right], 1\right]+\sqrt{-a^2} \left(-1+(-1+a x) \text{Log}\left[x^2\right]+(1-a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right) \Big/ \left(2 \sqrt{-a^2}\, c^2 (-1+a x) \sqrt{1-a^2 x^2}\right)$$

Problem 973: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 206 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{c x \sqrt{c-a^2 c x^2}}+\frac{a \sqrt{1-a^2 x^2}}{2 c (1-a x) \sqrt{c-a^2 c x^2}}+\frac{a \sqrt{1-a^2 x^2}\, \text{Log}[x]}{c \sqrt{c-a^2 c x^2}}-\frac{5 a \sqrt{1-a^2 x^2}\, \text{Log}[1-a x]}{4 c \sqrt{c-a^2 c x^2}}+\frac{a \sqrt{1-a^2 x^2}\, \text{Log}[1+a x]}{4 c \sqrt{c-a^2 c x^2}}$$

Result (type 4, 135 leaves):

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

Problem 974: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 255 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{2 c x^2 \sqrt{c-a^2 c x^2}} - \frac{a \sqrt{1-a^2 x^2}}{c x \sqrt{c-a^2 c x^2}} + \frac{a^2 \sqrt{1-a^2 x^2}}{2 c (1-a x) \sqrt{c-a^2 c x^2}} + \frac{2 a^2 \sqrt{1-a^2 x^2} \text{Log}[x]}{c \sqrt{c-a^2 c x^2}} - \frac{7 a^2 \sqrt{1-a^2 x^2} \text{Log}[1-a x]}{4 c \sqrt{c-a^2 c x^2}} - \frac{a^2 \sqrt{1-a^2 x^2} \text{Log}[1+a x]}{4 c \sqrt{c-a^2 c x^2}}$$

Result (type 4, 153 leaves):

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

Problem 975: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 297 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{3 c x^3 \sqrt{c-a^2 c x^2}} - \frac{a \sqrt{1-a^2 x^2}}{2 c x^2 \sqrt{c-a^2 c x^2}} - \frac{2 a^2 \sqrt{1-a^2 x^2}}{c x \sqrt{c-a^2 c x^2}} + \frac{a^3 \sqrt{1-a^2 x^2}}{2 c (1-a x) \sqrt{c-a^2 c x^2}} + \frac{2 a^3 \sqrt{1-a^2 x^2} \text{Log}[x]}{c \sqrt{c-a^2 c x^2}} - \frac{9 a^3 \sqrt{1-a^2 x^2} \text{Log}[1-a x]}{4 c \sqrt{c-a^2 c x^2}} + \frac{a^3 \sqrt{1-a^2 x^2} \text{Log}[1+a x]}{4 c \sqrt{c-a^2 c x^2}}$$

Result (type 4, 161 leaves):

$$\left(\sqrt{c-a^2 c x^2} \left(-15 i a^4 x^3 (-1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2} x\right], 1\right] + \sqrt{-a^2} \left(2+a x+9 a^2 x^2-15 a^3 x^3+6 a^3 x^3 (-1+a x) \text{Log}\left[x^2\right]-6 a^3 x^3 (-1+a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right) \Big/ \left(6 \sqrt{-a^2} c^2 x^3 (-1+a x) \sqrt{1-a^2 x^2}\right)$$

Problem 979: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 184 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a^4 c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{2 a^4 c^2 (1-a x) \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}}{8 a^4 c^2 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{8 a^4 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 122 leaves):

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

Problem 980: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 184 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a^3 c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{4 a^3 c^2 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a^3 c^2 (1+a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{8 a^3 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 119 leaves):

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

Problem 981: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 137 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a^2 c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}}{8 a^2 c^2 (1+a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{8 a^2 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 118 leaves):

$$-\frac{\sqrt{1-a^2 x^2}\left(\sqrt{-a^2}\left(2-a x+a^2 x^2\right)+i a (-1+a x)^2 (1+a x)\ \text{EllipticF}\left[i\ \text{ArcSinh}\left[\sqrt{-a^2}\ x\right],1\right]\right)}{8 \left(-a^2\right)^{3/2} c^2 (-1+a x)^2 (1+a x) \sqrt{c-a^2 c x^2}}$$

Problem 982: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 184 leaves, 5 steps):

$$\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^2\,(1-a\,x)^2\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}}{4\,a\,c^2\,(1-a\,x)\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^2\,(1+a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{3\,\sqrt{1-a^2\,x^2}\,\text{ArcTanh}[a\,x]}{8\,a\,c^2\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 120 leaves):

$$-\frac{a\,\sqrt{1-a^2\,x^2}\,\left(\sqrt{-a^2}\,\left(2+3\,a\,x-3\,a^2\,x^2\right)-3\,i\,a\,(-1+a\,x)^2\,(1+a\,x)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)}{8\,\left(-a^2\right)^{3/2}\,c^2\,(-1+a\,x)^2\,(1+a\,x)\,\sqrt{c-a^2\,c\,x^2}}$$

Problem 983: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 252 leaves, 4 steps):

$$\frac{\sqrt{1-a^2\,x^2}}{8\,c^2\,(1-a\,x)^2\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}}{2\,c^2\,(1-a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}}{8\,c^2\,(1+a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}\,\text{Log}[x]}{c^2\,\sqrt{c-a^2\,c\,x^2}}-\frac{11\,\sqrt{1-a^2\,x^2}\,\text{Log}[1-a\,x]}{16\,c^2\,\sqrt{c-a^2\,c\,x^2}}-\frac{5\,\sqrt{1-a^2\,x^2}\,\text{Log}[1+a\,x]}{16\,c^2\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 162 leaves):

$$\left(\sqrt{c-a^2\,c\,x^2}\,\left(-3\,i\,a\,(-1+a\,x)^2\,(1+a\,x)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]+\sqrt{-a^2}\,\left(6-a\,x-3\,a^2\,x^2+4\,(-1+a\,x)^2\,(1+a\,x)\,\text{Log}\left[x^2\right]-4\,(-1+a\,x)^2\,(1+a\,x)\,\text{Log}\left[1-a^2\,x^2\right]\right)\right)\right)\Big/\left(8\,\sqrt{-a^2}\,c^3\,(-1+a\,x)^2\,(1+a\,x)\,\sqrt{1-a^2\,x^2}\right)$$

Problem 984: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 295 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{c^2 x \sqrt{c-a^2 c x^2}}+\frac{a \sqrt{1-a^2 x^2}}{8 c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{3 a \sqrt{1-a^2 x^2}}{4 c^2 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{a \sqrt{1-a^2 x^2}}{8 c^2 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{a \sqrt{1-a^2 x^2}\, \text{Log}[x]}{c^2 \sqrt{c-a^2 c x^2}}-\frac{23 a \sqrt{1-a^2 x^2}\, \text{Log}[1-a x]}{16 c^2 \sqrt{c-a^2 c x^2}}+\frac{7 a \sqrt{1-a^2 x^2}\, \text{Log}[1+a x]}{16 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 180 leaves):

$$\left(\sqrt{c-a^2 c x^2} \left(-15 i a^2 x (-1+a x)^2 (1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\, x\right], 1\right]+\sqrt{-a^2} \left(-8+14 a x+11 a^2 x^2-15 a^3 x^3+4 a x (-1+a x)^2 (1+a x) \text{Log}\left[x^2\right]-4 a x (-1+a x)^2 (1+a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right) \Big/ \left(8 \sqrt{-a^2}\, c^3 x (-1+a x)^2 (1+a x) \sqrt{1-a^2 x^2}\right)$$

Problem 985: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 345 leaves, 4 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{2 c^2 x^2 \sqrt{c-a^2 c x^2}}-\frac{a \sqrt{1-a^2 x^2}}{c^2 x \sqrt{c-a^2 c x^2}}+\frac{a^2 \sqrt{1-a^2 x^2}}{8 c^2 (1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{a^2 \sqrt{1-a^2 x^2}}{c^2 (1-a x) \sqrt{c-a^2 c x^2}}+\frac{a^2 \sqrt{1-a^2 x^2}}{8 c^2 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{3 a^2 \sqrt{1-a^2 x^2}\, \text{Log}[x]}{c^2 \sqrt{c-a^2 c x^2}}-\frac{39 a^2 \sqrt{1-a^2 x^2}\, \text{Log}[1-a x]}{16 c^2 \sqrt{c-a^2 c x^2}}-\frac{9 a^2 \sqrt{1-a^2 x^2}\, \text{Log}[1+a x]}{16 c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 198 leaves):

$$\left(\sqrt{c-a^2 c x^2} \left(-15 i a^3 x^2 (-1+a x)^2 (1+a x) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\, x\right], 1\right]+\sqrt{-a^2} \left(-4-4 a x+22 a^2 x^2+3 a^3 x^3-15 a^4 x^4+12 a^2 x^2 (-1+a x)^2 (1+a x) \text{Log}\left[x^2\right]-12 a^2 x^2 (-1+a x)^2 (1+a x) \text{Log}\left[1-a^2 x^2\right]\right)\right)\right) \Big/ \left(8 \sqrt{-a^2}\, c^3 x^2 (-1+a x)^2 (1+a x) \sqrt{1-a^2 x^2}\right)$$

Problem 986: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 277 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{24 a c^3 (1-a x)^3 \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2}}{32 a c^3 (1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2}}{16 a c^3 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{32 a c^3 (1+a x)^2 \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a c^3 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{5 \sqrt{1-a^2 x^2} \text{ArcTanh}[a x]}{16 a c^3 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 138 leaves):

$$-\left(\left(a \sqrt{1-a^2 x^2} \left(\sqrt{-a^2} \left(-8-25 a x+25 a^2 x^2+15 a^3 x^3-15 a^4 x^4\right)-15 i a (-1+a x)^3 (1+a x)^2 \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\, x\right],1\right]\right)\right)\Big/\left(48 \left(-a^2\right)^{3/2} c^3 (-1+a x)^3 (1+a x)^2 \sqrt{c-a^2 c x^2}\right)\right)$$

Problem 989: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{e^{\text{ArcTanh}[a x]} x^m}{c-a^2 c x^2} \, dx$$

Optimal (type 5, 80 leaves, 4 steps):

$$\frac{x^{1+m} \text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},a^2 x^2\right]}{c (1+m)}+\frac{a x^{2+m} \text{Hypergeometric2F1}\left[\frac{3}{2},\frac{2+m}{2},\frac{4+m}{2},a^2 x^2\right]}{c (2+m)}$$

Result (type 6, 391 leaves):

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

Problem 990: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^2}\,dx$$

Optimal (type 5, 80 leaves, 4 steps):

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

Result (type 6, 711 leaves):

$$\left(\left(2+m\right) x^{1+m} \sqrt{-1-a x}\ \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,-a x,a x\right]\right)\Big/$$
$$\left(2 c^2 \left(1+m\right) \left(-1+a x\right)^{3/2} \left(2 \left(2+m\right) \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,-a x,a x\right]+a x\right.\right.$$
$$\left.\left.\left(3\ \text{AppellF1}\left[2+m,-\frac{1}{2},\frac{5}{2},3+m,-a x,a x\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{3}{2},3+m,-a x,a x\right]\right)\right)\right)+$$
$$\left(\left(2+m\right) x^{1+m} \sqrt{1-a x}\ \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,a x,-a x\right]\right)\Big/\left(4 c^2 \left(1+m\right) \left(1+a x\right)^{3/2} \left(2 \left(2+m\right) \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{3}{2},2+m,a x,-a x\right]-\right.\right.$$
$$\left.\left.a x \left(3\ \text{AppellF1}\left[2+m,-\frac{1}{2},\frac{5}{2},3+m,a x,-a x\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{3}{2},3+m,a x,-a x\right]\right)\right)\right)-$$
$$\left(\left(2+m\right) x^{1+m} \sqrt{-1-a x}\ \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{5}{2},2+m,-a x,a x\right]\right)\Big/\left(2 c^2 \left(1+m\right) \left(-1+a x\right)^{5/2} \left(2 \left(2+m\right) \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{5}{2},2+m,-a x,a x\right]+\right.\right.$$
$$\left.\left.a x \left(5\ \text{AppellF1}\left[2+m,-\frac{1}{2},\frac{7}{2},3+m,-a x,a x\right]+\text{AppellF1}\left[2+m,\frac{1}{2},\frac{5}{2},3+m,-a x,a x\right]\right)\right)\right)+$$
$$\left(3 \left(2+m\right) x^{1+m} \sqrt{-1-a x} \sqrt{1-a x} \sqrt{1-a^2 x^2}\ \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-a x,a x\right]\right)\Big/$$
$$\left(8 c^2 \left(1+m\right) \left(-1+a x\right)^{3/2} \sqrt{1+a x} \left(2 \left(2+m\right) \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-a x,a x\right]+\right.\right.$$
$$\left.\left.a x \left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,-a x,a x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2 x^2\right]\right)\right)\right)+$$
$$\left(3 \left(2+m\right) x^{1+m} \sqrt{1-a x}\ \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,a x,-a x\right]\right)\Big/\left(8 c^2 \left(1+m\right) \sqrt{1+a x} \left(2 \left(2+m\right) \text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,a x,-a x\right]-\right.\right.$$
$$\left.\left.a x \left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,a x,-a x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2 x^2\right]\right)\right)\right)$$

Problem 991: Unable to integrate problem.

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

Optimal (type 5, 80 leaves, 4 steps):

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

Result (type 8, 25 leaves):

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

Problem 1001: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a x]} x^m}{\sqrt{c-a^2 c x^2}} \, dx$$

Optimal (type 5, 51 leaves, 3 steps):

$$\frac{x^{1+m} \sqrt{1-a^2 x^2} \; \text{Hypergeometric2F1}[1, 1+m, 2+m, a x]}{(1+m) \sqrt{c-a^2 c x^2}}$$

Result (type 8, 27 leaves):

$$\int \frac{e^{\text{ArcTanh}[a x]} x^m}{\sqrt{c-a^2 c x^2}} \, dx$$

Problem 1002: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a x]} x^m}{(c-a^2 c x^2)^{3/2}} \, dx$$

Optimal (type 5, 134 leaves, 7 steps):

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

Result (type 8, 27 leaves):

$$\int \frac{e^{\text{ArcTanh}[a x]} x^m}{(c-a^2 c x^2)^{3/2}} \, dx$$

Problem 1003: Unable to integrate problem.

$$\int \frac{e^{\text{ArcTanh}[a x]} x^m}{(c-a^2 c x^2)^{5/2}} \, dx$$

Optimal (type 5, 134 leaves, 7 steps):

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

Result (type 8, 27 leaves):

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

Problem 1004: Unable to integrate problem.

$$\int e^{\text{ArcTanh}[a x]} x^m \left(c - a^2 c x^2\right)^p \, dx$$

Optimal (type 5, 136 leaves, 5 steps):

$$\frac{x^{1+m} \left(1 - a^2 x^2\right)^{-p} \left(c - a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[\frac{1+m}{2}, \frac{1}{2} - p, \frac{3+m}{2}, a^2 x^2\right]}{1+m} + \frac{a x^{2+m} \left(1 - a^2 x^2\right)^{-p} \left(c - a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[\frac{2+m}{2}, \frac{1}{2} - p, \frac{4+m}{2}, a^2 x^2\right]}{2+m}$$

Result (type 8, 25 leaves):

$$\int e^{\text{ArcTanh}[a x]} x^m \left(c - a^2 c x^2\right)^p \, dx$$

Problem 1005: Result more than twice size of optimal antiderivative.

$$\int e^{\text{ArcTanh}[a x]} x^3 \left(1 - a^2 x^2\right)^p \, dx$$

Optimal (type 5, 85 leaves, 6 steps):

$$-\frac{\left(1 - a^2 x^2\right)^{\frac{1}{2}+p}}{a^4 (1 + 2 p)} + \frac{\left(1 - a^2 x^2\right)^{\frac{3}{2}+p}}{a^4 (3 + 2 p)} + \frac{1}{5} a x^5 \text{Hypergeometric2F1}\left[\frac{5}{2}, \frac{1}{2} - p, \frac{7}{2}, a^2 x^2\right]$$

Result (type 5, 183 leaves):

$$\frac{1}{3 a^4}\left(-3 a x \text{Hypergeometric2F1}\left[\frac{1}{2}, -\frac{1}{2} - p, \frac{3}{2}, a^2 x^2\right] + \frac{1}{3 + 2 p}\left(-3 + 3 \left(1 - a^2 x^2\right)^{\frac{1}{2}+p} - 3 a^2 x^2 \left(1 - a^2 x^2\right)^{\frac{1}{2}+p} - a^3 (3 + 2 p) x^3 \text{Hypergeometric2F1}\left[\frac{3}{2}, -\frac{1}{2} - p, \frac{5}{2}, a^2 x^2\right] + 3 (1 - a x)^{-\frac{1}{2}-p} (1 + a x) \left(2 - 2 a^2 x^2\right)^{\frac{1}{2}+p} \text{Hypergeometric2F1}\left[\frac{1}{2} - p, \frac{3}{2} + p, \frac{5}{2} + p, \frac{1}{2} (1 + a x)\right]\right)\right)$$

Problem 1009: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{\text{ArcTanh}[a x]} \left(1 - a^2 x^2\right)^p}{x} \, dx$$

Optimal (type 5, 72 leaves, 5 steps):

$$a\,x\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-p,\frac{3}{2},a^2x^2\right]-\frac{\left(1-a^2x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 5, 147 leaves):

$$\left(1-a^2x^2\right)^{\frac{1}{2}+p}\left(\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,-\frac{1}{2}-p,\frac{1}{2}-p,\frac{1}{a^2x^2}\right]}{\left(1-\frac{1}{a^2x^2}\right)^{\frac{1}{2}+p}+2p\left(1-\frac{1}{a^2x^2}\right)^{\frac{1}{2}+p}}+\frac{2^{\frac{1}{2}+p}\,(1-a\,x)^{-\frac{1}{2}-p}\,(1+a\,x)\,\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}(1+a\,x)\right]}{3+2p}\right)$$

Problem 1010: Result more than twice size of optimal antiderivative.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\left(1-a^2x^2\right)^p}{x^2}\,dx$$

Optimal (type 5, 75 leaves, 5 steps):

$$-\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}-\frac{a\left(1-a^2x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 5, 170 leaves):

$$-\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2},-\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}+\frac{a\left(1-\frac{1}{a^2x^2}\right)^{-\frac{1}{2}-p}\left(1-a^2x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,-\frac{1}{2}-p,\frac{1}{2}-p,\frac{1}{a^2x^2}\right]}{1+2p}+$$
$$\frac{a\,(1-a\,x)^{-\frac{1}{2}-p}\,(1+a\,x)\left(2-2a^2x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}(1+a\,x)\right]}{3+2p}$$

Problem 1011: Result more than twice size of optimal antiderivative.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\left(1-a^2x^2\right)^p}{x^3}\,dx$$

Optimal (type 5, 78 leaves, 5 steps):

$$-\frac{a\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}-\frac{a^2\left(1-a^2x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[2,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 5, 262 leaves):

$$-\frac{a\,\text{Hypergeometric2F1}\left[-\frac{1}{2},-\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}+\frac{a^2\left(1-a^2x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,-\frac{1}{2}-p,\frac{1}{2}-p,\frac{1}{a^2x^2}\right]}{\left(1-\frac{1}{a^2x^2}\right)^{\frac{1}{2}+p}+2p\left(1-\frac{1}{a^2x^2}\right)^{\frac{1}{2}+p}}+$$

$$\frac{\left(1-\frac{1}{a^2x^2}\right)^{-\frac{1}{2}-p}\left(1-a^2x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,\frac{1}{2}-p,\frac{3}{2}-p,\frac{1}{a^2x^2}\right]}{(-1+2p)\,x^2}+$$

$$\frac{a^2(1-ax)^{-\frac{1}{2}-p}(1+ax)\left(2-2a^2x^2\right)^{\frac{1}{2}+p}\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}(1+ax)\right]}{3+2p}$$

Problem 1012: Result more than twice size of optimal antiderivative.

$$\int e^{\text{ArcTanh}[a\,x]}\,x^3\left(c-a^2c\,x^2\right)^p\,dx$$

Optimal (type 5, 134 leaves, 7 steps):

$$-\frac{\sqrt{1-a^2x^2}\left(c-a^2c\,x^2\right)^p}{a^4(1+2p)}+\frac{\left(1-a^2x^2\right)^{3/2}\left(c-a^2c\,x^2\right)^p}{a^4(3+2p)}+\frac{1}{5}a\,x^5\left(1-a^2x^2\right)^{-p}\left(c-a^2c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{1}{2}-p,\frac{7}{2},a^2x^2\right]$$

Result (type 5, 295 leaves):

$$\frac{1}{a^4(3+2p)(5+2p)(7+2p)(9+2p)}4^{1+p}e^{3\,\text{ArcTanh}[a\,x]}\left(\frac{e^{\text{ArcTanh}[a\,x]}}{1+e^{2\,\text{ArcTanh}[a\,x]}}\right)^{2p}\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^{2p}$$
$$\left(1-a^2x^2\right)^{-p}\left(c\left(1-a^2x^2\right)\right)^p\left(-\left(315+286p+84p^2+8p^3\right)\text{Hypergeometric2F1}\left[\frac{3}{2}+p,5+2p,\frac{5}{2}+p,-e^{2\,\text{ArcTanh}[a\,x]}\right]+\right.$$
$$e^{2\,\text{ArcTanh}[a\,x]}(3+2p)\left(3\left(63+32p+4p^2\right)\text{Hypergeometric2F1}\left[\frac{5}{2}+p,5+2p,\frac{7}{2}+p,-e^{2\,\text{ArcTanh}[a\,x]}\right]+\right.$$
$$e^{2\,\text{ArcTanh}[a\,x]}(5+2p)\left(-3(9+2p)\,\text{Hypergeometric2F1}\left[\frac{7}{2}+p,5+2p,\frac{9}{2}+p,-e^{2\,\text{ArcTanh}[a\,x]}\right]+\right.$$
$$\left.\left.\left.e^{2\,\text{ArcTanh}[a\,x]}(7+2p)\,\text{Hypergeometric2F1}\left[\frac{9}{2}+p,5+2p,\frac{11}{2}+p,-e^{2\,\text{ArcTanh}[a\,x]}\right]\right)\right)\right)$$

Problem 1016: Unable to integrate problem.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\left(c-a^2c\,x^2\right)^p}{x}\,dx$$

Optimal (type 5, 110 leaves, 6 steps):

$$a\,x\,\left(1-a^2x^2\right)^{-p}\left(c-a^2c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-p,\frac{3}{2},a^2x^2\right]-\frac{\sqrt{1-a^2x^2}\,\left(c-a^2c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 8, 25 leaves):

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\left(c-a^2c\,x^2\right)^p}{x}\,dx$$

Problem 1017: Unable to integrate problem.

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\left(c-a^2c\,x^2\right)^p}{x^2}\,dx$$

Optimal (type 5, 113 leaves, 6 steps):

$$-\frac{\left(1-a^2x^2\right)^{-p}\left(c-a^2c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}-\frac{a\sqrt{1-a^2x^2}\,\left(c-a^2c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 8, 25 leaves):

$$\int\frac{e^{\text{ArcTanh}[a\,x]}\left(c-a^2c\,x^2\right)^p}{x^2}\,dx$$

Problem 1018: Unable to integrate problem.

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

Optimal (type 5, 116 leaves, 6 steps):

$$-\frac{a\,\left(1-a^2x^2\right)^{-p}\left(c-a^2c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}-\frac{a^2\sqrt{1-a^2x^2}\,\left(c-a^2c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[2,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 8, 25 leaves):

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

Problem 1035: Result more than twice size of optimal antiderivative.

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

Optimal (type 1, 17 leaves, 2 steps):

$$-\frac{c^2 (1+a x)^4}{2 x^2}$$

Result (type 1, 42 leaves):

$$-\frac{c^2}{2 x^2}-\frac{2 a c^2}{x}-2 a^3 c^2 x-\frac{1}{2} a^4 c^2 x^2$$

Problem 1053: Result unnecessarily involves higher level functions.

$$\int \frac{e^{2 \text{ArcTanh}[a x]}}{c-a^2 c x^2} \, dx$$

Optimal (type 1, 15 leaves, 2 steps):

$$\frac{1}{a c (1-a x)}$$

Result (type 3, 18 leaves):

$$\frac{e^{2 \text{ArcTanh}[a x]}}{2 a c}$$

Problem 1130: Result unnecessarily involves higher level functions.

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

Optimal (type 5, 203 leaves, 8 steps):

$$-\frac{(2-m) (4-m) x^{1+m}}{24 c^3 (1+a x)}+\frac{x^{1+m}}{6 c^3 (1-a x)^3 (1+a x)}+\frac{(4-m) x^{1+m}}{12 c^3 (1-a x)^2 (1+a x)}+\frac{(7-2 m) (2-m) x^{1+m}}{24 c^3 (1-a x) (1+a x)}+$$
$$\frac{(2-m) x^{1+m} \text{Hypergeometric2F1}[1, 1+m, 2+m, -a x]}{16 c^3 (1+m)}+\frac{(2-m) \left(3-8 m+2 m^2\right) x^{1+m} \text{Hypergeometric2F1}[1, 1+m, 2+m, a x]}{48 c^3 (1+m)}$$

Result (type 6, 109 leaves):

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

Problem 1133: Result unnecessarily involves higher level functions.

$$\int e^{2\,\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a^2\,c\,x^2}\,dx$$

Optimal (type 5, 172 leaves, 7 steps):

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

Result (type 6, 193 leaves):

$$\frac{1}{1+m}x^{1+m}\left(-\frac{\sqrt{c-a^2\,c\,x^2}\;\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{\sqrt{1-a^2\,x^2}}-\right.$$
$$\left(4\,(2+m)\,\sqrt{-c\,(1+a\,x)}\;\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]\right)\Big/\left(\sqrt{-1+a\,x}\,\left(2\,(2+m)\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,a\,x,-a\,x\right]+\right.\right.$$
$$\left.\left.\left.a\,x\,\left(\text{AppellF1}\left[2+m,\frac{3}{2},-\frac{1}{2},3+m,a\,x,-a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2\,x^2\right]\right)\right)\right)\right)$$

Problem 1134: Result unnecessarily involves higher level functions.

$$\int \frac{e^{2\,\text{ArcTanh}[a\,x]}\,x^m}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

Optimal (type 5, 169 leaves, 7 steps):

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

Result (type 6, 133 leaves):

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

Problem 1135: Result unnecessarily involves higher level functions and more than twice size of optimal

antiderivative.

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

Optimal (type 5, 183 leaves, 7 steps):

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

Result (type 6, 582 leaves):

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

Problem 1136: Result more than twice size of optimal antiderivative.

$$\int e^{2\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 55 leaves, 3 steps):

$$-\frac{2^{1+p}\,(1+a\,x)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[-1-p,\,p,\,1+p,\,\frac{1}{2}\,(1-a\,x)\right]}{a\,p}$$

Result (type 5, 133 leaves):

$$\frac{1}{a\,(1+p)}\left(-\left(-1+a\,x\right)^2\right)^{-p}\,(-2+2\,a\,x)^p\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p$$
$$\left(-a\,(1+p)\,x\,\left(\frac{1}{2}-\frac{a\,x}{2}\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,-p,\,\frac{3}{2},\,a^2\,x^2\right]+(1+a\,x)\,\left(1-a^2\,x^2\right)^p\,\text{Hypergeometric2F1}\left[1-p,\,1+p,\,2+p,\,\frac{1}{2}\,(1+a\,x)\right]\right)$$

Problem 1171: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 185 leaves, 5 steps):

$$\frac{\sqrt{1-a^2\,x^2}}{6\,a\,c^2\,(1-a\,x)^3\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^2\,(1-a\,x)^2\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^2\,(1-a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}\,\text{ArcTanh}[a\,x]}{8\,a\,c^2\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 108 leaves):

$$-\frac{a\,\sqrt{1-a^2\,x^2}\,\left(\sqrt{-a^2}\,\left(-10+9\,a\,x-3\,a^2\,x^2\right)-3\,i\,a\,(-1+a\,x)^3\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],\,1\right]\right)}{24\,\left(-a^2\right)^{3/2}\,c^2\,(-1+a\,x)^3\,\sqrt{c-a^2\,c\,x^2}}$$

Problem 1172: Result unnecessarily involves higher level functions.

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

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

$$\frac{\sqrt{1-a^2 x^2}}{16 a c^3 (1-a x)^4 \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}}{12 a c^3 (1-a x)^3 \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2}}{32 a c^3 (1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}}{8 a c^3 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{32 a c^3 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{5 \sqrt{1-a^2 x^2}\ \text{ArcTanh}[a x]}{32 a c^3 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 136 leaves):

$$-\left(\left(a \sqrt{1-a^2 x^2} \left(\sqrt{-a^2} \left(32-15 a x-35 a^2 x^2+45 a^3 x^3-15 a^4 x^4\right)-15 i a (-1+a x)^4 (1+a x)\ \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-a^2}\ x\right],1\right]\right)\right)\Big/\left(96 \left(-a^2\right)^{3/2} c^3 (-1+a x)^4 (1+a x) \sqrt{c-a^2 c x^2}\right)\right)$$

Problem 1173: Unable to integrate problem.

$$\int e^{3 \text{ArcTanh}[a x]} x^m \sqrt{c-a^2 c x^2}\, dx$$

Optimal (type 5, 136 leaves, 5 steps):

$$-\frac{3 x^{1+m} \sqrt{c-a^2 c x^2}}{(1+m) \sqrt{1-a^2 x^2}}-\frac{a x^{2+m} \sqrt{c-a^2 c x^2}}{(2+m) \sqrt{1-a^2 x^2}}+\frac{4 x^{1+m} \sqrt{c-a^2 c x^2}\ \text{Hypergeometric2F1}[1,1+m,2+m,a x]}{(1+m) \sqrt{1-a^2 x^2}}$$

Result (type 8, 29 leaves):

$$\int e^{3 \text{ArcTanh}[a x]} x^m \sqrt{c-a^2 c x^2}\, dx$$

Problem 1174: Unable to integrate problem.

$$\int e^{3 \text{ArcTanh}[a x]} x^m \left(c-a^2 c x^2\right)^p dx$$

Optimal (type 5, 251 leaves, 7 steps):

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

Result (type 8, 27 leaves):

$$\int e^{3\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Problem 1179: Unable to integrate problem.

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

Optimal (type 5, 193 leaves, 8 steps):

$$\frac{4\,\left(c-a^2\,c\,x^2\right)^p}{(1-2\,p)\,\sqrt{1-a^2\,x^2}}-\frac{a\,x\,\left(c-a^2\,c\,x^2\right)^p}{2\,p\,\sqrt{1-a^2\,x^2}}+\frac{a\,(1+6\,p)\,x\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{2}-p,\frac{3}{2},a^2\,x^2\right]}{2\,p}-\frac{\sqrt{1-a^2\,x^2}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2\,x^2\right]}{1+2\,p}$$

Result (type 8, 27 leaves):

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

Problem 1180: Unable to integrate problem.

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

Optimal (type 5, 187 leaves, 9 steps):

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

Result (type 8, 27 leaves):

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

Problem 1181: Unable to integrate problem.

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

Optimal (type 5, 194 leaves, 8 steps):

$$-\frac{\left(c-a^2 c x^2\right)^p}{2 x^2 \sqrt{1-a^2 x^2}}-\frac{3 a \left(c-a^2 c x^2\right)^p}{x \sqrt{1-a^2 x^2}}+a^3 (7-6 p) x \left(1-a^2 x^2\right)^{-p} \left(c-a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{2}-p,\frac{3}{2},a^2 x^2\right]+\frac{a^2 (9-2 p) \left(c-a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[1,-\frac{1}{2}+p,\frac{1}{2}+p,1-a^2 x^2\right]}{2 (1-2 p) \sqrt{1-a^2 x^2}}$$

Result (type 8, 27 leaves):

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

Problem 1185: Result more than twice size of optimal antiderivative.

$$\int e^{4 \text{ArcTanh}[a x]} \left(c-a^2 c x^2\right)^2 \, dx$$

Optimal (type 1, 17 leaves, 2 steps):

$$\frac{c^2 (1+a x)^5}{5 a}$$

Result (type 1, 49 leaves):

$$c^2 x+2 a c^2 x^2+2 a^2 c^2 x^3+a^3 c^2 x^4+\frac{1}{5} a^4 c^2 x^5$$

Problem 1187: Result unnecessarily involves higher level functions.

$$\int \frac{e^{4 \text{ArcTanh}[a x]}}{c-a^2 c x^2} \, dx$$

Optimal (type 1, 13 leaves, 2 steps):

$$\frac{x}{c (1-a x)^2}$$

Result (type 3, 18 leaves):

$$\frac{e^{4 \text{ArcTanh}[a x]}}{4 a c}$$

Problem 1191: Result more than twice size of optimal antiderivative.

$$\int e^{4\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 63 leaves, 3 steps):

$$\frac{2^{2+p}\,c\,(1+a\,x)^{1-p}\,\left(c-a^2\,c\,x^2\right)^{-1+p}\,\text{Hypergeometric2F1}\left[-2-p,\,-1+p,\,p,\,\frac{1}{2}\,(1-a\,x)\right]}{a\,(1-p)}$$

Result (type 5, 159 leaves):

$$\frac{1}{a\,(1+p)}\left(-\left(-1+a\,x\right)^2\right)^{-p}\,(-2+2\,a\,x)^p\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\left(a\,(1+p)\,x\,\left(\frac{1}{2}-\frac{a\,x}{2}\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,-p,\,\frac{3}{2},\,a^2\,x^2\right]-\right.$$
$$\left.(1+a\,x)\,\left(1-a^2\,x^2\right)^p\,\left(2\,\text{Hypergeometric2F1}\left[1-p,\,1+p,\,2+p,\,\frac{1}{2}\,(1+a\,x)\right]-\text{Hypergeometric2F1}\left[2-p,\,1+p,\,2+p,\,\frac{1}{2}\,(1+a\,x)\right]\right)\right)$$

Problem 1211: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{e^{-\text{ArcTanh}[a\,x]}}{\sqrt{c-a^2\,c\,x^2}}\,dx$$

Optimal (type 3, 39 leaves, 3 steps):

$$\frac{\sqrt{1-a^2\,x^2}\,\text{Log}[1+a\,x]}{a\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 87 leaves):

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

Problem 1212: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 90 leaves, 5 steps):

$$-\frac{\sqrt{1-a^2 x^2}}{2 a c (1+a x) \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2} \operatorname{ArcTanh}[a x]}{2 a c \sqrt{c-a^2 c x^2}}$$

Result (type 4, 89 leaves):

$$\frac{a \sqrt{1-a^2 x^2} \left(\sqrt{-a^2}+i a (1+a x) \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-a^2} x\right], 1\right]\right)}{2 \left(-a^2\right)^{3/2} (c+a c x) \sqrt{c-a^2 c x^2}}$$

Problem 1213: Result unnecessarily involves higher level functions.

$$\int \frac{e^{-\operatorname{ArcTanh}[a x]}}{\left(c-a^2 c x^2\right)^{5/2}} \, dx$$

Optimal (type 3, 183 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{8 a c^2 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{8 a c^2 (1+a x)^2 \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{4 a c^2 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{3 \sqrt{1-a^2 x^2} \operatorname{ArcTanh}[a x]}{8 a c^2 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 118 leaves):

$$-\frac{a \sqrt{1-a^2 x^2} \left(\sqrt{-a^2} \left(2-3 a x-3 a^2 x^2\right)-3 i a (-1+a x) (1+a x)^2 \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-a^2} x\right], 1\right]\right)}{8 \left(-a^2\right)^{3/2} (-1+a x) (c+a c x)^2 \sqrt{c-a^2 c x^2}}$$

Problem 1214: Result unnecessarily involves higher level functions.

$$\int \frac{e^{-\operatorname{ArcTanh}[a x]}}{\left(c-a^2 c x^2\right)^{7/2}} \, dx$$

Optimal (type 3, 276 leaves, 5 steps):

$$\frac{\sqrt{1-a^2 x^2}}{32 a c^3 (1-a x)^2 \sqrt{c-a^2 c x^2}}+\frac{\sqrt{1-a^2 x^2}}{8 a c^3 (1-a x) \sqrt{c-a^2 c x^2}}-\frac{\sqrt{1-a^2 x^2}}{24 a c^3 (1+a x)^3 \sqrt{c-a^2 c x^2}}-$$
$$\frac{3 \sqrt{1-a^2 x^2}}{32 a c^3 (1+a x)^2 \sqrt{c-a^2 c x^2}}-\frac{3 \sqrt{1-a^2 x^2}}{16 a c^3 (1+a x) \sqrt{c-a^2 c x^2}}+\frac{5 \sqrt{1-a^2 x^2} \operatorname{ArcTanh}[a x]}{16 a c^3 \sqrt{c-a^2 c x^2}}$$

Result (type 4, 136 leaves):

$$-\left(\left(a\sqrt{1-a^2x^2}\left(\sqrt{-a^2}\left(-8+25ax+25a^2x^2-15a^3x^3-15a^4x^4\right)-15\,i\,a\,(-1+ax)^2(1+ax)^3\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(48\left(-a^2\right)^{3/2}(-1+ax)^2(c+acx)^3\sqrt{c-a^2cx^2}\right)\right)$$

Problem 1215: Unable to integrate problem.

$$\int e^{-\text{ArcTanh}[a x]}\, x^m \left(c-a^2 c x^2\right)^p dx$$

Optimal (type 5, 137 leaves, 5 steps):

$$\frac{x^{1+m}\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{1+m}{2},\frac{1}{2}-p,\frac{3+m}{2},a^2x^2\right]}{1+m}-\frac{a\,x^{2+m}\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{2+m}{2},\frac{1}{2}-p,\frac{4+m}{2},a^2x^2\right]}{2+m}$$

Result (type 8, 27 leaves):

$$\int e^{-\text{ArcTanh}[a x]}\, x^m \left(c-a^2 c x^2\right)^p dx$$

Problem 1216: Result more than twice size of optimal antiderivative.

$$\int e^{-\text{ArcTanh}[a x]}\, x^3 \left(1-a^2 x^2\right)^p dx$$

Optimal (type 5, 85 leaves, 6 steps):

$$-\frac{\left(1-a^2x^2\right)^{\frac{1}{2}+p}}{a^4\,(1+2p)}+\frac{\left(1-a^2x^2\right)^{\frac{3}{2}+p}}{a^4\,(3+2p)}-\frac{1}{5}\,a\,x^5\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{1}{2}-p,\frac{7}{2},a^2x^2\right]$$

Result (type 5, 183 leaves):

$$\frac{1}{3a^4}\left(3\,a\,x\,\text{Hypergeometric2F1}\left[\frac{1}{2},-\frac{1}{2}-p,\frac{3}{2},a^2x^2\right]+\frac{1}{3+2p}\left(-3+3\left(1-a^2x^2\right)^{\frac{1}{2}+p}-3a^2x^2\left(1-a^2x^2\right)^{\frac{1}{2}+p}+a^3(3+2p)\,x^3\,\text{Hypergeometric2F1}\left[\frac{3}{2},-\frac{1}{2}-p,\frac{5}{2},a^2x^2\right]+3\,(1-ax)\,(1+ax)^{-\frac{1}{2}-p}\left(2-2a^2x^2\right)^{\frac{1}{2}+p}\,\text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}-\frac{a\,x}{2}\right]\right)\right)$$

Problem 1220: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{-\text{ArcTanh}[a x]} \left(1-a^2 x^2\right)^p}{x} \, dx$$

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

$$-a x \,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-p,\frac{3}{2},a^2 x^2\right]-\frac{\left(1-a^2 x^2\right)^{\frac{1}{2}+p} \text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2 x^2\right]}{1+2 p}$$

Result (type 5, 148 leaves):

$$\left(1-a^2 x^2\right)^{\frac{1}{2}+p} \left(\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2}-p,-\frac{1}{2}-p,\frac{1}{2}-p,\frac{1}{a^2 x^2}\right]}{\left(1-\frac{1}{a^2 x^2}\right)^{\frac{1}{2}+p}+2 p \left(1-\frac{1}{a^2 x^2}\right)^{\frac{1}{2}+p}}+\frac{2^{\frac{1}{2}+p} (1-a x) (1+a x)^{-\frac{1}{2}-p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}-\frac{a x}{2}\right]}{3+2 p}\right)$$

Problem 1221: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{-\text{ArcTanh}[a x]} \left(1-a^2 x^2\right)^p}{x^2} \, dx$$

Optimal (type 5, 74 leaves, 5 steps):

$$-\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}-p,\frac{1}{2},a^2 x^2\right]}{x}+\frac{a \left(1-a^2 x^2\right)^{\frac{1}{2}+p} \text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2 x^2\right]}{1+2 p}$$

Result (type 5, 171 leaves):

$$-\frac{\text{Hypergeometric2F1}\left[-\frac{1}{2},-\frac{1}{2}-p,\frac{1}{2},a^2 x^2\right]}{x}-\frac{a \left(1-\frac{1}{a^2 x^2}\right)^{-\frac{1}{2}-p} \left(1-a^2 x^2\right)^{\frac{1}{2}+p} \text{Hypergeometric2F1}\left[-\frac{1}{2}-p,-\frac{1}{2}-p,\frac{1}{2}-p,\frac{1}{a^2 x^2}\right]}{1+2 p}+$$
$$\frac{a (-1+a x) (1+a x)^{-\frac{1}{2}-p} \left(2-2 a^2 x^2\right)^{\frac{1}{2}+p} \text{Hypergeometric2F1}\left[\frac{1}{2}-p,\frac{3}{2}+p,\frac{5}{2}+p,\frac{1}{2}-\frac{a x}{2}\right]}{3+2 p}$$

Problem 1222: Result more than twice size of optimal antiderivative.

$$\int e^{-\text{ArcTanh}[a x]} x^3 \left(c-a^2 c x^2\right)^p \, dx$$

Optimal (type 5, 134 leaves, 7 steps):

$$-\frac{\sqrt{1-a^2x^2}\,\left(c-a^2cx^2\right)^p}{a^4\,(1+2p)}+\frac{\left(1-a^2x^2\right)^{3/2}\left(c-a^2cx^2\right)^p}{a^4\,(3+2p)}-\frac{1}{5}a\,x^5\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{1}{2}-p,\frac{7}{2},a^2x^2\right]$$

Result (type 5, 290 leaves):

$$\frac{1}{a^4\,(1+2p)\,(3+2p)\,(5+2p)\,(7+2p)}4^{1+p}\left(\frac{e^{\text{ArcTanh}[a\,x]}}{1+e^{2\,\text{ArcTanh}[a\,x]}}\right)^{1+2p}\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^{1+2p}$$
$$\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\left(-\left(105+142p+60p^2+8p^3\right)\text{Hypergeometric2F1}\left[\frac{1}{2}+p,5+2p,\frac{3}{2}+p,-e^{2\,\text{ArcTanh}[a\,x]}\right]+\right.$$
$$e^{2\,\text{ArcTanh}[a\,x]}\,(1+2p)\left(3\left(35+24p+4p^2\right)\text{Hypergeometric2F1}\left[\frac{3}{2}+p,5+2p,\frac{5}{2}+p,-e^{2\,\text{ArcTanh}[a\,x]}\right]+\right.$$
$$e^{2\,\text{ArcTanh}[a\,x]}\,(3+2p)\left(-3\,(7+2p)\,\text{Hypergeometric2F1}\left[\frac{5}{2}+p,5+2p,\frac{7}{2}+p,-e^{2\,\text{ArcTanh}[a\,x]}\right]+\right.$$
$$\left.\left.\left.e^{2\,\text{ArcTanh}[a\,x]}\,(5+2p)\,\text{Hypergeometric2F1}\left[\frac{7}{2}+p,5+2p,\frac{9}{2}+p,-e^{2\,\text{ArcTanh}[a\,x]}\right]\right)\right)\right)$$

Problem 1226: Unable to integrate problem.

$$\int\frac{e^{-\text{ArcTanh}[a\,x]}\left(c-a^2cx^2\right)^p}{x}\,dx$$

Optimal (type 5, 111 leaves, 6 steps):

$$-a\,x\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-p,\frac{3}{2},a^2x^2\right]-\frac{\sqrt{1-a^2x^2}\,\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 8, 27 leaves):

$$\int\frac{e^{-\text{ArcTanh}[a\,x]}\left(c-a^2cx^2\right)^p}{x}\,dx$$

Problem 1227: Unable to integrate problem.

$$\int\frac{e^{-\text{ArcTanh}[a\,x]}\left(c-a^2cx^2\right)^p}{x^2}\,dx$$

Optimal (type 5, 112 leaves, 6 steps):

$$-\frac{\left(1-a^2x^2\right)^{-p}\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1}{2}-p,\frac{1}{2},a^2x^2\right]}{x}+\frac{a\sqrt{1-a^2x^2}\,\left(c-a^2cx^2\right)^p\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}+p,\frac{3}{2}+p,1-a^2x^2\right]}{1+2p}$$

Result (type 8, 27 leaves):

$$\int \frac{e^{-\text{ArcTanh}[a\,x]}\left(c-a^2\,c\,x^2\right)^p}{x^2}\,dx$$

Problem 1232: Result unnecessarily involves higher level functions.

$$\int \frac{e^{-2\,\text{ArcTanh}[a\,x]}}{c-a^2\,c\,x^2}\,dx$$

Optimal (type 1, 15 leaves, 2 steps):

$$-\frac{1}{a\,c\,(1+a\,x)}$$

Result (type 3, 18 leaves):

$$-\frac{e^{-2\,\text{ArcTanh}[a\,x]}}{2\,a\,c}$$

Problem 1252: Result unnecessarily involves higher level functions.

$$\int e^{-2\,\text{ArcTanh}[a\,x]}\,x^m\,\sqrt{c-a^2\,c\,x^2}\,dx$$

Optimal (type 5, 172 leaves, 7 steps):

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

Result (type 6, 192 leaves):

$$\frac{1}{1+m}x^{1+m}\left(-\frac{\sqrt{c-a^2\,c\,x^2}\,\text{Hypergeometric2F1}\left[-\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},a^2\,x^2\right]}{\sqrt{1-a^2\,x^2}}-\right.$$
$$\left(4\,(2+m)\,\sqrt{c-a\,c\,x}\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,-a\,x,a\,x\right]\right)\Big/\left(\sqrt{1+a\,x}\,\left(-2\,(2+m)\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,-a\,x,a\,x\right]+\right.\right.$$
$$\left.\left.\left.a\,x\left(\text{AppellF1}\left[2+m,\frac{3}{2},-\frac{1}{2},3+m,-a\,x,a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},a^2\,x^2\right]\right)\right)\right)\right)$$

Problem 1253: Result more than twice size of optimal antiderivative.

$$\int e^{-2\,\text{ArcTanh}[a\,x]}\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 54 leaves, 3 steps):

$$\frac{2^{1+p}\,(1-a\,x)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[-1-p,\,p,\,1+p,\,\frac{1}{2}\,(1+a\,x)\right]}{a\,p}$$

Result (type 5, 125 leaves):

$$\frac{1}{a\,(1+p)}2^p\,(1+a\,x)^{-p}\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p$$
$$\left(-a\,(1+p)\,x\,\left(\frac{1}{2}+\frac{a\,x}{2}\right)^p\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,-p,\,\frac{3}{2},\,a^2\,x^2\right]+(-1+a\,x)\,\left(1-a^2\,x^2\right)^p\,\text{Hypergeometric2F1}\left[1-p,\,1+p,\,2+p,\,\frac{1}{2}-\frac{a\,x}{2}\right]\right)$$

Problem 1277: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 182 leaves, 5 steps):

$$-\frac{\sqrt{1-a^2\,x^2}}{6\,a\,c^2\,(1+a\,x)^3\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^2\,(1+a\,x)^2\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^2\,(1+a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{\sqrt{1-a^2\,x^2}\,\,\text{ArcTanh}[a\,x]}{8\,a\,c^2\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 108 leaves):

$$\frac{a\,\sqrt{1-a^2\,x^2}\,\left(\sqrt{-a^2}\,\left(10+9\,a\,x+3\,a^2\,x^2\right)+3\,i\,a\,(1+a\,x)^3\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,\,x\right],\,1\right]\right)}{24\,\left(-a^2\right)^{3/2}\,c^2\,(1+a\,x)^3\,\sqrt{c-a^2\,c\,x^2}}$$

Problem 1278: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 275 leaves, 5 steps):

$$\frac{\sqrt{1-a^2\,x^2}}{32\,a\,c^3\,(1-a\,x)\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{16\,a\,c^3\,(1+a\,x)^4\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{12\,a\,c^3\,(1+a\,x)^3\,\sqrt{c-a^2\,c\,x^2}}-$$
$$\frac{3\,\sqrt{1-a^2\,x^2}}{32\,a\,c^3\,(1+a\,x)^2\,\sqrt{c-a^2\,c\,x^2}}-\frac{\sqrt{1-a^2\,x^2}}{8\,a\,c^3\,(1+a\,x)\,\sqrt{c-a^2\,c\,x^2}}+\frac{5\,\sqrt{1-a^2\,x^2}\,\,\text{ArcTanh}[a\,x]}{32\,a\,c^3\,\sqrt{c-a^2\,c\,x^2}}$$

Result (type 4, 136 leaves):

$$-\left(\left(a\sqrt{1-a^2x^2}\left(\sqrt{-a^2}\left(32+15ax-35a^2x^2-45a^3x^3-15a^4x^4\right)-15\,i\,a\,(-1+ax)\,(1+ax)^4\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-a^2}\,x\right],1\right]\right)\right)\Big/\left(96\,(-a^2)^{3/2}c^3\,(-1+ax)\,(1+ax)^4\sqrt{c-a^2cx^2}\right)\right)$$

Problem 1279: Unable to integrate problem.

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,x^m\sqrt{c-a^2cx^2}\,dx$$

Optimal (type 5, 136 leaves, 5 steps) :

$$-\frac{3x^{1+m}\sqrt{c-a^2cx^2}}{(1+m)\sqrt{1-a^2x^2}}+\frac{a\,x^{2+m}\sqrt{c-a^2cx^2}}{(2+m)\sqrt{1-a^2x^2}}+\frac{4x^{1+m}\sqrt{c-a^2cx^2}\,\text{Hypergeometric2F1}[1,1+m,2+m,-a\,x]}{(1+m)\sqrt{1-a^2x^2}}$$

Result (type 8, 29 leaves) :

$$\int e^{-3\,\text{ArcTanh}[a\,x]}\,x^m\sqrt{c-a^2cx^2}\,dx$$

Problem 1281: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(1-a^2x^2\right)^{5/2}dx$$

Optimal (type 3, 359 leaves, 18 steps) :

$$\frac{231(1-ax)^{1/4}(1+ax)^{3/4}}{512a}+\frac{231(1-ax)^{5/4}(1+ax)^{3/4}}{1280a}+\frac{77(1-ax)^{9/4}(1+ax)^{3/4}}{960a}-\frac{77(1-ax)^{13/4}(1+ax)^{3/4}}{480a}-\frac{11(1-ax)^{13/4}(1+ax)^{7/4}}{60a}-\frac{(1-ax)^{13/4}(1+ax)^{11/4}}{6a}+\frac{231\,\text{ArcTan}\left[1-\frac{\sqrt{2}(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{512\sqrt{2}\,a}-\frac{231\,\text{ArcTan}\left[1+\frac{\sqrt{2}(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{512\sqrt{2}\,a}+\frac{231\,\text{Log}\left[1+\frac{\sqrt{1-ax}}{\sqrt{1+ax}}-\frac{\sqrt{2}(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{1024\sqrt{2}\,a}-\frac{231\,\text{Log}\left[1+\frac{\sqrt{1-ax}}{\sqrt{1+ax}}+\frac{\sqrt{2}(1-ax)^{1/4}}{(1+ax)^{1/4}}\right]}{1024\sqrt{2}\,a}$$

Result (type 7, 422 leaves) :

$$\frac{1}{1920\, a \left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^6}\Bigg(960\, e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4\left(-1+3\,e^{2\,\text{ArcTanh}[a\,x]}\right)-360\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^6\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]+$$

$$80\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2\left(\frac{39\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{\left(-1+a^2x^2\right)^2}-\right.$$

$$\left.\left(\text{Cosh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]+\text{Sinh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]\right)\left(13\,\text{Cosh}[3\,\text{ArcTanh}[a\,x]]+\frac{7-166\,a\,x+26\sqrt{1-a^2x^2}\ \text{Sinh}[3\,\text{ArcTanh}[a\,x]]}{\sqrt{1-a^2x^2}}\right)\right)$$

$$\left(\text{Cosh}[4\,\text{ArcTanh}[a\,x]]+\text{Sinh}[4\,\text{ArcTanh}[a\,x]]\right)-\left(-\frac{3300\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{\left(-1+a^2x^2\right)^3}-\right.$$

$$\left(\text{Cosh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]+\text{Sinh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]\right)\left(\frac{286}{\sqrt{1-a^2x^2}}+\frac{12\,556\,a\,x}{\sqrt{1-a^2x^2}}-129\,\text{Cosh}[3\,\text{ArcTanh}[a\,x]]+275\,\text{Cosh}[5\,\text{ArcTanh}[a\,x]]-\right.$$

$$\left.\left.7374\,\text{Sinh}[3\,\text{ArcTanh}[a\,x]]+550\,\text{Sinh}[5\,\text{ArcTanh}[a\,x]]\right)\right)\left(\text{Cosh}[6\,\text{ArcTanh}[a\,x]]+\text{Sinh}[6\,\text{ArcTanh}[a\,x]]\right)\Bigg)$$

Problem 1282: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\text{ArcTanh}[a\,x]}\left(1-a^2x^2\right)^{3/2}\,dx$$

Optimal (type 3, 307 leaves, 16 steps):

$$\frac{35\,(1-a\,x)^{1/4}\,(1+a\,x)^{3/4}}{64\,a}+\frac{7\,(1-a\,x)^{5/4}\,(1+a\,x)^{3/4}}{32\,a}-\frac{7\,(1-a\,x)^{9/4}\,(1+a\,x)^{3/4}}{24\,a}-\frac{(1-a\,x)^{9/4}\,(1+a\,x)^{7/4}}{4\,a}+$$

$$\frac{35\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\sqrt{2}\,a}-\frac{35\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{64\sqrt{2}\,a}+\frac{35\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}-\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\sqrt{2}\,a}-\frac{35\,\text{Log}\left[1+\frac{\sqrt{1-a\,x}}{\sqrt{1+a\,x}}+\frac{\sqrt{2}\,(1-a\,x)^{1/4}}{(1+a\,x)^{1/4}}\right]}{128\sqrt{2}\,a}$$

Result (type 7, 249 leaves):

$$\frac{1}{48\,a\,\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4}\left(24\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2\left(-1+3\,e^{2\,\text{ArcTanh}[a\,x]}\right)-9\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^4\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]+\left(\frac{39\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{\left(-1+a^2\,x^2\right)^2}-\left(\text{Cosh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]+\text{Sinh}\left[\frac{1}{2}\text{ArcTanh}[a\,x]\right]\right)\left(13\,\text{Cosh}[3\,\text{ArcTanh}[a\,x]]+\frac{7-166\,a\,x+26\,\sqrt{1-a^2\,x^2}\,\text{Sinh}[3\,\text{ArcTanh}[a\,x]]}{\sqrt{1-a^2\,x^2}}\right)\right)\left(\text{Cosh}[4\,\text{ArcTanh}[a\,x]]+\text{Sinh}[4\,\text{ArcTanh}[a\,x]]\right)\right)$$

Problem 1283: Result is not expressed in closed-form.

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

Optimal (type 3, 255 leaves, 14 steps):

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

Result (type 7, 83 leaves):

$$\frac{\frac{8\,e^{\frac{3}{2}\text{ArcTanh}[a\,x]}\left(-1+3\,e^{2\,\text{ArcTanh}[a\,x]}\right)}{\left(1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2}-3\,\text{RootSum}\left[1+\#1^4\,\&,\frac{\text{ArcTanh}[a\,x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{16\,a}$$

Problem 1284: Result is not expressed in closed-form.

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

Optimal (type 3, 193 leaves, 12 steps):

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

Result (type 7, 46 leaves):

$$\frac{\text{RootSum}\left[1+\#1^4\,\&,\ \frac{-\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]}{2\,a}$$

Problem 1289: Result is not expressed in closed-form.

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

Optimal (type 3, 679 leaves, 19 steps):

$$\frac{231 c^2 (1-a x)^{1/4} (1+a x)^{3/4} \sqrt{c-a^2 c x^2}}{512 a \sqrt{1-a^2 x^2}}+\frac{231 c^2 (1-a x)^{5/4} (1+a x)^{3/4} \sqrt{c-a^2 c x^2}}{1280 a \sqrt{1-a^2 x^2}}+$$
$$\frac{77 c^2 (1-a x)^{9/4} (1+a x)^{3/4} \sqrt{c-a^2 c x^2}}{960 a \sqrt{1-a^2 x^2}}-\frac{77 c^2 (1-a x)^{13/4} (1+a x)^{3/4} \sqrt{c-a^2 c x^2}}{480 a \sqrt{1-a^2 x^2}}-\frac{11 c^2 (1-a x)^{13/4} (1+a x)^{7/4} \sqrt{c-a^2 c x^2}}{60 a \sqrt{1-a^2 x^2}}-$$
$$\frac{c^2 (1-a x)^{13/4} (1+a x)^{11/4} \sqrt{c-a^2 c x^2}}{6 a \sqrt{1-a^2 x^2}}+\frac{231 c^2 \sqrt{c-a^2 c x^2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{512 \sqrt{2}\, a \sqrt{1-a^2 x^2}}-\frac{231 c^2 \sqrt{c-a^2 c x^2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{512 \sqrt{2}\, a \sqrt{1-a^2 x^2}}+$$
$$\frac{231 c^2 \sqrt{c-a^2 c x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{1024 \sqrt{2}\, a \sqrt{1-a^2 x^2}}-\frac{231 c^2 \sqrt{c-a^2 c x^2}\,\text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2}\,(1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{1024 \sqrt{2}\, a \sqrt{1-a^2 x^2}}$$

Result (type 7, 167 leaves):

$$-\left(\left(c^3 \sqrt{1-a^2 x^2}\left(-8\, e^{\frac{3}{2}\text{ArcTanh}[a x]}\left(-1155-6435\, e^{2\,\text{ArcTanh}[a x]}-14670\, e^{4\,\text{ArcTanh}[a x]}+48202\, e^{6\,\text{ArcTanh}[a x]}+20097\, e^{8\,\text{ArcTanh}[a x]}+3465\, e^{10\,\text{ArcTanh}[a x]}\right)+\right.\right.\right.$$
$$\left.\left.\left.3465\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^6 \text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTanh}[a x]-2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]\right)\right)\Big/\left(30720\, a\left(1+e^{2\,\text{ArcTanh}[a x]}\right)^6 \sqrt{c-a^2 c x^2}\right)\right)$$

Problem 1290: Result is not expressed in closed-form.

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

Optimal (type 3, 547 leaves, 17 steps):

$$\frac{35 c (1-a x)^{1/4} (1+a x)^{3/4} \sqrt{c-a^2 c x^2}}{64 a \sqrt{1-a^2 x^2}}+\frac{7 c (1-a x)^{5/4} (1+a x)^{3/4} \sqrt{c-a^2 c x^2}}{32 a \sqrt{1-a^2 x^2}}-\frac{7 c (1-a x)^{9/4} (1+a x)^{3/4} \sqrt{c-a^2 c x^2}}{24 a \sqrt{1-a^2 x^2}}-\frac{c (1-a x)^{9/4} (1+a x)^{7/4} \sqrt{c-a^2 c x^2}}{4 a \sqrt{1-a^2 x^2}}+\frac{35 c \sqrt{c-a^2 c x^2} \text{ArcTan}\left[1-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64 \sqrt{2} a \sqrt{1-a^2 x^2}}-\frac{35 c \sqrt{c-a^2 c x^2} \text{ArcTan}\left[1+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{64 \sqrt{2} a \sqrt{1-a^2 x^2}}+\frac{35 c \sqrt{c-a^2 c x^2} \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}-\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128 \sqrt{2} a \sqrt{1-a^2 x^2}}-\frac{35 c \sqrt{c-a^2 c x^2} \text{Log}\left[1+\frac{\sqrt{1-a x}}{\sqrt{1+a x}}+\frac{\sqrt{2} (1-a x)^{1/4}}{(1+a x)^{1/4}}\right]}{128 \sqrt{2} a \sqrt{1-a^2 x^2}}$$

Result (type 7, 147 leaves):

$$-\left(\left(c^2 \sqrt{1-a^2 x^2} \left(-8 e^{\frac{3}{2} \text{ArcTanh}[a x]} \left(-35-125 e^{2 \text{ArcTanh}[a x]}+399 e^{4 \text{ArcTanh}[a x]}+105 e^{6 \text{ArcTanh}[a x]}\right)+105 \left(1+e^{2 \text{ArcTanh}[a x]}\right)^4 \text{RootSum}\left[1+\#1^4\&,\frac{\text{ArcTanh}[a x]-2 \text{Log}\left[e^{\frac{1}{2} \text{ArcTanh}[a x]}-\#1\right]}{\#1}\&\right]\right)\right)\Big/\left(768 a \left(1+e^{2 \text{ArcTanh}[a x]}\right)^4 \sqrt{c-a^2 c x^2}\right)\right)$$

Problem 1291: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2} \text{ArcTanh}[a x]} \sqrt{c-a^2 c x^2}\, dx$$

Optimal (type 3, 429 leaves, 15 steps):

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

Result (type 7, 126 leaves):

$$\left(c \sqrt{1-a^2 x^2} \left(8 e^{\frac{3}{2} \text{ArcTanh}[a x]} \left(-1+3 e^{2 \text{ArcTanh}[a x]}\right)-3 \left(1+e^{2 \text{ArcTanh}[a x]}\right)^2 \text{RootSum}\left[1+\#1^4\&,\frac{\text{ArcTanh}[a x]-2 \text{Log}\left[e^{\frac{1}{2} \text{ArcTanh}[a x]}-\#1\right]}{\#1}\&\right]\right)\right)\Big/\left(16 a \left(1+e^{2 \text{ArcTanh}[a x]}\right)^2 \sqrt{c \left(1-a^2 x^2\right)}\right)$$

Problem 1292: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a x]}}{\sqrt{c-a^2 c x^2}}\,dx$$

Optimal (type 3, 309 leaves, 13 steps):

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

Result (type 7, 79 leaves):

$$\frac{\sqrt{c\,(1-a^2x^2)}\,\text{RootSum}\left[1+\#1^4\,\&,\frac{-\text{ArcTanh}[a x]+2\,\text{Log}\left[e^{\frac{1}{2}\text{ArcTanh}[a x]}-\#1\right]}{\#1}\,\&\right]}{2\,a\,c\,\sqrt{1-a^2x^2}}$$

Problem 1307: Unable to integrate problem.

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a x]}}{x\,(c-a^2 c x^2)^{9/8}}\,dx$$

Optimal (type 6, 73 leaves, 3 steps):

$$-\frac{2\times 2^{5/8}\,(1+a x)^{1/8}\,(1-a^2x^2)^{1/8}\,\text{AppellF1}\left[\frac{1}{8},\frac{11}{8},1,\frac{9}{8},\frac{1}{2}\,(1+a x),1+a x\right]}{c\,(c-a^2 c x^2)^{1/8}}$$

Result (type 8, 31 leaves):

$$\int \frac{e^{\frac{1}{2}\text{ArcTanh}[a x]}}{x\,(c-a^2 c x^2)^{9/8}}\,dx$$

Problem 1309: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTanh}[a x]}\,(c-a^2 c x^2)^2\,dx$$

Optimal (type 5, 70 leaves, 2 steps):

$$-\frac{2^{3+\frac{n}{2}}\,c^2\,(1-a\,x)^{3-\frac{n}{2}}\,\text{Hypergeometric2F1}\left[-2-\frac{n}{2},\,3-\frac{n}{2},\,4-\frac{n}{2},\,\frac{1}{2}\,(1-a\,x)\right]}{a\,(6-n)}$$

Result (type 5, 184 leaves) :

$$\frac{1}{120\,a}c^2\,e^{n\,\text{ArcTanh}[a\,x]}\,\Big(22\,n-n^3+120\,a\,x-22\,a\,n^2\,x+a\,n^4\,x-28\,a^2\,n\,x^2+a^2\,n^3\,x^2-80\,a^3\,x^3+2\,a^3\,n^2\,x^3+6\,a^4\,n\,x^4+24\,a^5\,x^5-e^{2\,\text{ArcTanh}[a\,x]}\,n\,(32-16\,n-2\,n^2+n^3)\,\text{Hypergeometric2F1}\left[1,\,1+\frac{n}{2},\,2+\frac{n}{2},\,-e^{2\,\text{ArcTanh}[a\,x]}\right]+(64-20\,n^2+n^4)\,\text{Hypergeometric2F1}\left[1,\,\frac{n}{2},\,1+\frac{n}{2},\,-e^{2\,\text{ArcTanh}[a\,x]}\right]\Big)$$

Problem 1310: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,(c-a^2\,c\,x^2)^3\,dx$$

Optimal (type 5, 70 leaves, 2 steps) :

$$-\frac{2^{4+\frac{n}{2}}\,c^3\,(1-a\,x)^{4-\frac{n}{2}}\,\text{Hypergeometric2F1}\left[-3-\frac{n}{2},\,4-\frac{n}{2},\,5-\frac{n}{2},\,\frac{1}{2}\,(1-a\,x)\right]}{a\,(8-n)}$$

Result (type 5, 272 leaves) :

$$-\frac{1}{5040\,a}c^3\,e^{n\,\text{ArcTanh}[a\,x]}\,\Big(-912\,n+58\,n^3-n^5-5040\,a\,x+912\,a\,n^2\,x-58\,a\,n^4\,x+a\,n^6\,x+1368\,a^2\,n\,x^2-64\,a^2\,n^3\,x^2+a^2\,n^5\,x^2+5040\,a^3\,x^3-152\,a^3\,n^2\,x^3+2\,a^3\,n^4\,x^3-576\,a^4\,n\,x^4+6\,a^4\,n^3\,x^4-3024\,a^5\,x^5+24\,a^5\,n^2\,x^5+120\,a^6\,n\,x^6+720\,a^7\,x^7-e^{2\,\text{ArcTanh}[a\,x]}\,n\,(-1152+576\,n+104\,n^2-52\,n^3-2\,n^4+n^5)\,\text{Hypergeometric2F1}\left[1,\,1+\frac{n}{2},\,2+\frac{n}{2},\,-e^{2\,\text{ArcTanh}[a\,x]}\right]+(-2304+784\,n^2-56\,n^4+n^6)\,\text{Hypergeometric2F1}\left[1,\,\frac{n}{2},\,1+\frac{n}{2},\,-e^{2\,\text{ArcTanh}[a\,x]}\right]\Big)$$

Problem 1356: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,(c-a^2\,c\,x^2)^2\,dx$$

Optimal (type 6, 42 leaves, 2 steps) :

$$\frac{c^2\,x^{1+m}\,\text{AppellF1}\left[1+m,\,\frac{1}{2}\,(-4+n),\,-2-\frac{n}{2},\,2+m,\,a\,x,\,-a\,x\right]}{1+m}$$

Result (type 8, 27 leaves) :

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)^2\,dx$$

Problem 1357: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)\,dx$$

Optimal (type 6, 40 leaves, 2 steps):

$$\frac{c\,x^{1+m}\,\text{AppellF1}\left[1+m,\,\frac{1}{2}\,(-2+n),\,-1-\frac{n}{2},\,2+m,\,a\,x,\,-a\,x\right]}{1+m}$$

Result (type 8, 25 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)\,dx$$

Problem 1358: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}\,x^m}{c-a^2\,c\,x^2}\,dx$$

Optimal (type 6, 42 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,\frac{2+n}{2},\,1-\frac{n}{2},\,2+m,\,a\,x,\,-a\,x\right]}{c\,(1+m)}$$

Result (type 6, 106 leaves):

$$\frac{1}{a\,c\,n}e^{n\,\text{ArcTanh}[a\,x]}\,\left(-1+e^{-2\,\text{ArcTanh}[a\,x]}\right)^m\,\left(1+e^{-2\,\text{ArcTanh}[a\,x]}\right)^m$$
$$\left(-e^{-4\,\text{ArcTanh}[a\,x]}\,\left(-1+e^{2\,\text{ArcTanh}[a\,x]}\right)^2\right)^{-m}\,x^m\,\text{AppellF1}\left[-\frac{n}{2},\,m,\,-m,\,1-\frac{n}{2},\,-e^{-2\,\text{ArcTanh}[a\,x]},\,e^{-2\,\text{ArcTanh}[a\,x]}\right]$$

Problem 1359: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^2}\,dx$$

Optimal (type 6, 42 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,\frac{4+n}{2},\,2-\frac{n}{2},\,2+m,\,a\,x,\,-a\,x\right]}{c^2\,(1+m)}$$

Result (type 8, 27 leaves):

$$\int \frac{e^{n\,\text{ArcTanh}[a\,x]}\,x^m}{\left(c-a^2\,c\,x^2\right)^2}\,dx$$

Problem 1360: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 6, 70 leaves, 3 steps):

$$\frac{x^{1+m}\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{AppellF1}\left[1+m,\,\frac{1}{2}\,\left(n-2\,p\right),\,-\frac{n}{2}-p,\,2+m,\,a\,x,\,-a\,x\right]}{1+m}$$

Result (type 8, 27 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x^m\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Problem 1361: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 177 leaves, 4 steps):

$$-\frac{\left(1-a\,x\right)^{1-\frac{n}{2}+p}\,\left(1+a\,x\right)^{1+\frac{n}{2}+p}\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p}{2\,a^2\,\left(1+p\right)}-\frac{1}{a^2\,\left(1+p\right)\,\left(2-n+2\,p\right)}$$

$$2^{\frac{n}{2}+p}\,n\,\left(1-a\,x\right)^{1-\frac{n}{2}+p}\,\left(1-a^2\,x^2\right)^{-p}\,\left(c-a^2\,c\,x^2\right)^p\,\text{Hypergeometric2F1}\left[-\frac{n}{2}-p,\,1-\frac{n}{2}+p,\,2-\frac{n}{2}+p,\,\frac{1}{2}\,\left(1-a\,x\right)\right]$$

Result (type 8, 25 leaves):

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,x\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Problem 1362: Unable to integrate problem.

$$\int e^{n\,\text{ArcTanh}[a\,x]}\,\left(c-a^2\,c\,x^2\right)^p\,dx$$

Optimal (type 5, 103 leaves, 3 steps):

$$-\frac{1}{a\left(2-n+2p\right)}2^{1+\frac{n}{2}+p}\left(1-a x\right)^{1-\frac{n}{2}+p}\left(1-a^2 x^2\right)^{-p}\left(c-a^2 c x^2\right)^{p}\text{Hypergeometric2F1}\left[-\frac{n}{2}-p,1-\frac{n}{2}+p,2-\frac{n}{2}+p,\frac{1}{2}\left(1-a x\right)\right]$$

Result (type 8, 24 leaves):

$$\int e^{n\,\text{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^{p}\,dx$$

Problem 1363: Unable to integrate problem.

$$\int e^{2\,(1+p)\,\text{ArcTanh}[a x]}\left(1-a^2 x^2\right)^{-p}\,dx$$

Optimal (type 3, 41 leaves, 3 steps):

$$\frac{\left(1-a x\right)^{1-2p}}{a\left(1-2p\right)}+\frac{\left(1-a x\right)^{-2p}}{a p}$$

Result (type 8, 28 leaves):

$$\int e^{2\,(1+p)\,\text{ArcTanh}[a x]}\left(1-a^2 x^2\right)^{-p}\,dx$$

Problem 1364: Unable to integrate problem.

$$\int e^{2\,(1+p)\,\text{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^{-p}\,dx$$

Optimal (type 3, 95 leaves, 4 steps):

$$\frac{\left(1-a x\right)^{1-2p}\left(1-a^2 x^2\right)^{p}\left(c-a^2 c x^2\right)^{-p}}{a\left(1-2p\right)}+\frac{\left(1-a x\right)^{-2p}\left(1-a^2 x^2\right)^{p}\left(c-a^2 c x^2\right)^{-p}}{a p}$$

Result (type 8, 29 leaves):

$$\int e^{2\,(1+p)\,\text{ArcTanh}[a x]}\left(c-a^2 c x^2\right)^{-p}\,dx$$

Test results for the 361 problems in "7.3.7 Inverse hyperbolic tangent functions.m"

Problem 16: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{9/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]dx$$

Optimal (type 4, 196 leaves, 6 steps):

$$-\frac{60\,d^2\,\sqrt{x}\,\sqrt{d+e\,x^2}}{847\,e^{5/2}}+\frac{36\,d\,x^{5/2}\,\sqrt{d+e\,x^2}}{847\,e^{3/2}}-\frac{4\,x^{9/2}\,\sqrt{d+e\,x^2}}{121\,\sqrt{e}}+\frac{2}{11}\,x^{11/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]+\frac{30\,d^{11/4}\,\left(\sqrt{d}+\sqrt{e}\,x\right)\,\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\mathrm{EllipticF}\left[2\,\mathrm{ArcTan}\left[\frac{e^{1/4}\,\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{847\,e^{11/4}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 161 leaves):

$$\frac{2}{847}\,\sqrt{x}\,\left(-\frac{2\,\sqrt{d+e\,x^2}\,\left(15\,d^2-9\,d\,e\,x^2+7\,e^2\,x^4\right)}{e^{5/2}}+77\,x^5\,\mathrm{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)+\frac{60\,d^{5/2}\,\sqrt{\frac{i\,\sqrt{d}}{\sqrt{e}}}\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\frac{\sqrt{\frac{i\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{847\,e^2\,\sqrt{d+e\,x^2}}$$

Problem 17: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{5/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]dx$$

Optimal (type 4, 168 leaves, 5 steps):

$$\frac{20\,d\,\sqrt{x}\,\sqrt{d+e\,x^2}}{147\,e^{3/2}}-\frac{4\,x^{5/2}\,\sqrt{d+e\,x^2}}{49\,\sqrt{e}}+\frac{2}{7}\,x^{7/2}\,\mathrm{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]-\frac{10\,d^{7/4}\,\left(\sqrt{d}+\sqrt{e}\,x\right)\,\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\mathrm{EllipticF}\left[2\,\mathrm{ArcTan}\left[\frac{e^{1/4}\,\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{147\,e^{7/4}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 147 leaves):

$$\frac{2}{147}\,\sqrt{x}\,\left(\frac{2\,\left(5\,d-3\,e\,x^2\right)\,\sqrt{d+e\,x^2}}{e^{3/2}}+21\,x^3\,\mathrm{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)+\frac{20\,\sqrt{d}\,\left(\frac{i\,\sqrt{d}}{\sqrt{e}}\right)^{5/2}\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\frac{\sqrt{\frac{i\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{147\,\sqrt{d+e\,x^2}}$$

Problem 18: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right] dx$$

Optimal (type 4, 142 leaves, 4 steps):

$$-\frac{4\sqrt{x}\,\sqrt{d+e\,x^2}}{9\sqrt{e}}+\frac{2}{3}x^{3/2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]+\frac{2\,d^{3/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{9\,e^{3/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 135 leaves):

$$\frac{2}{9}\sqrt{x}\left(-\frac{2\sqrt{d+e\,x^2}}{\sqrt{e}}+3\,x\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)+\frac{4\sqrt{d}\,\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{9\sqrt{d+e\,x^2}}$$

Problem 19: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{3/2}}\,dx$$

Optimal (type 4, 113 leaves, 3 steps):

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{\sqrt{x}}+\frac{2\,e^{1/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{d^{1/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 111 leaves):

$$-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{\sqrt{x}}+\frac{4\,i\sqrt{e}\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\,\sqrt{d+e\,x^2}}$$

Problem 20: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{x^{7/2}}\, dx$$

Optimal (type 4, 145 leaves, 4 steps):

$$-\frac{4 \sqrt{e}\, \sqrt{d+e x^2}}{15\, d\, x^{3/2}}-\frac{2\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{5\, x^{5/2}}-\frac{2\, e^{5/4} \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{15\, d^{5/4} \sqrt{d+e x^2}}$$

Result (type 4, 142 leaves):

$$-\frac{2 \left(2 \sqrt{e}\, x \sqrt{d+e x^2}+3\, d\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]\right)}{15\, d\, x^{5/2}}-\frac{4 \sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}\, e^2 \sqrt{1+\frac{d}{e x^2}}\, x\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\frac{\sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{15\, d^{3/2} \sqrt{d+e x^2}}$$

Problem 21: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{x^{11/2}}\, dx$$

Optimal (type 4, 173 leaves, 5 steps):

$$-\frac{4 \sqrt{e}\, \sqrt{d+e x^2}}{63\, d\, x^{7/2}}+\frac{20\, e^{3/2} \sqrt{d+e x^2}}{189\, d^2\, x^{3/2}}-\frac{2\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{9\, x^{9/2}}+\frac{10\, e^{9/4} \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{189\, d^{9/4} \sqrt{d+e x^2}}$$

Result (type 4, 154 leaves):

$$\frac{4 \sqrt{e}\, x \sqrt{d+e x^2} \left(-3\, d+5\, e x^2\right)-42\, d^2\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{189\, d^2\, x^{9/2}}+\frac{20 \sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}\, e^3 \sqrt{1+\frac{d}{e x^2}}\, x\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\frac{\sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{189\, d^{5/2} \sqrt{d+e x^2}}$$

Problem 22: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{x^{15/2}}\, dx$$

Optimal (type 4, 201 leaves, 6 steps):

$$-\frac{4 \sqrt{e}\, \sqrt{d+e x^2}}{143\, d\, x^{11/2}}+\frac{36\, e^{3/2} \sqrt{d+e x^2}}{1001\, d^2\, x^{7/2}}-\frac{60\, e^{5/2} \sqrt{d+e x^2}}{1001\, d^3\, x^{3/2}}-\frac{2\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{13\, x^{13/2}}-\frac{30\, e^{13/4} \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right], \frac{1}{2}\right]}{1001\, d^{13/4} \sqrt{d+e x^2}}$$

Result (type 4, 163 leaves):

$$\frac{1}{1001\, x^{13/2}} 2 \left(-\frac{2 \sqrt{e}\, x \sqrt{d+e x^2}\, \left(7 d^2-9 d e x^2+15 e^2 x^4\right)}{d^3}-77\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]-\frac{30 \sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}\, e^4 \sqrt{1+\frac{d}{e x^2}}\, x^{15/2}\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\frac{\sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right], -1\right]}{d^{7/2} \sqrt{d+e x^2}}\right)$$

Problem 23: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{7/2}\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right] dx$$

Optimal (type 4, 297 leaves, 7 steps):

$$\frac{28\, d\, x^{3/2} \sqrt{d+e x^2}}{405\, e^{3/2}}-\frac{4\, x^{7/2} \sqrt{d+e x^2}}{81 \sqrt{e}}-\frac{28\, d^2 \sqrt{x}\, \sqrt{d+e x^2}}{135\, e^2 \left(\sqrt{d}+\sqrt{e}\, x\right)}+\frac{2}{9} x^{9/2}\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]+\frac{28\, d^{9/4} \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\, \text{EllipticE}\left[2\, \text{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right], \frac{1}{2}\right]}{135\, e^{9/4} \sqrt{d+e x^2}}-\frac{14\, d^{9/4} \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right], \frac{1}{2}\right]}{135\, e^{9/4} \sqrt{d+e x^2}}$$

Result (type 4, 224 leaves):

$$\frac{1}{405\, e^2 \sqrt{\frac{i \sqrt{e}\, x}{\sqrt{d}}}\, \sqrt{d+e\, x^2}} 2 \sqrt{x} \left(\sqrt{e}\, x \sqrt{\frac{i \sqrt{e}\, x}{\sqrt{d}}} \left(14\, d^2 + 4\, d\, e\, x^2 - 10\, e^2\, x^4 + 45\, e^{3/2}\, x^3 \sqrt{d+e\, x^2}\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e\, x^2}}\right]\right) - 42\, d^{5/2} \sqrt{1+\frac{e\, x^2}{d}}\, \text{EllipticE}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{e}\, x}{\sqrt{d}}}\right], -1\right] + 42\, d^{5/2} \sqrt{1+\frac{e\, x^2}{d}}\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{e}\, x}{\sqrt{d}}}\right], -1\right]\right)$$

Problem 24: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{3/2}\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e\, x^2}}\right] dx$$

Optimal (type 4, 269 leaves, 6 steps):

$$-\frac{4\, x^{3/2} \sqrt{d+e\, x^2}}{25 \sqrt{e}} + \frac{12\, d \sqrt{x} \sqrt{d+e\, x^2}}{25\, e \left(\sqrt{d}+\sqrt{e}\, x\right)} + \frac{2}{5} x^{5/2}\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e\, x^2}}\right] - \frac{12\, d^{5/4} \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e\, x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\, \text{EllipticE}\left[2\, \text{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right], \frac{1}{2}\right]}{25\, e^{5/4} \sqrt{d+e\, x^2}} + \frac{6\, d^{5/4} \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e\, x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right], \frac{1}{2}\right]}{25\, e^{5/4} \sqrt{d+e\, x^2}}$$

Result (type 4, 211 leaves):

$$-\frac{1}{25\, e \sqrt{\frac{i \sqrt{e}\, x}{\sqrt{d}}}\, \sqrt{d+e\, x^2}} 2 \sqrt{x} \left(\sqrt{e}\, x \sqrt{\frac{i \sqrt{e}\, x}{\sqrt{d}}} \left(2\, d + 2\, e\, x^2 - 5 \sqrt{e}\, x \sqrt{d+e\, x^2}\, \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e\, x^2}}\right]\right) - 6\, d^{3/2} \sqrt{1+\frac{e\, x^2}{d}}\, \text{EllipticE}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{e}\, x}{\sqrt{d}}}\right], -1\right] + 6\, d^{3/2} \sqrt{1+\frac{e\, x^2}{d}}\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{\frac{i \sqrt{e}\, x}{\sqrt{d}}}\right], -1\right]\right)$$

Problem 25: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e\, x^2}}\right]}{\sqrt{x}} dx$$

Optimal (type 4, 232 leaves, 5 steps):

$$-\frac{4\sqrt{x}\sqrt{d+e x^2}}{\sqrt{d}+\sqrt{e}\,x}+2\sqrt{x}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e x^2}}\right]+\frac{4 d^{1/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{e^{1/4}\sqrt{d+e x^2}}-\frac{2 d^{1/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{e^{1/4}\sqrt{d+e x^2}}$$

Result (type 4, 182 leaves):

$$\frac{1}{\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e x^2}}2\sqrt{x}\left(\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e x^2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e x^2}}\right]-2\sqrt{d}\sqrt{1+\frac{e x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+2\sqrt{d}\sqrt{1+\frac{e x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)$$

Problem 26: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e x^2}}\right]}{x^{5/2}}\,dx$$

Optimal (type 4, 272 leaves, 6 steps):

$$-\frac{4\sqrt{e}\sqrt{d+e x^2}}{3 d\sqrt{x}}+\frac{4 e\sqrt{x}\sqrt{d+e x^2}}{3 d\left(\sqrt{d}+\sqrt{e}\,x\right)}-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e x^2}}\right]}{3 x^{3/2}}-\frac{4 e^{3/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{3 d^{3/4}\sqrt{d+e x^2}}+\frac{2 e^{3/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{3 d^{3/4}\sqrt{d+e x^2}}$$

Result (type 4, 214 leaves):

$$\left(-2\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\left(2\sqrt{e}\,x\,(d+e\,x^2)+d\sqrt{d+e\,x^2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)+4\sqrt{d}\,e\,x^2\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]-4\sqrt{d}\,e\,x^2\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\Big/\left(3\,d\,x^{3/2}\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\right)$$

Problem 27: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{9/2}}\,dx$$

Optimal (type 4, 302 leaves, 7 steps):

$$-\frac{4\sqrt{e}\sqrt{d+e\,x^2}}{35\,d\,x^{5/2}}+\frac{12\,e^{3/2}\sqrt{d+e\,x^2}}{35\,d^2\sqrt{x}}-\frac{12\,e^2\sqrt{x}\sqrt{d+e\,x^2}}{35\,d^2\left(\sqrt{d}+\sqrt{e}\,x\right)}-\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{7\,x^{7/2}}+\frac{12\,e^{7/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{35\,d^{7/4}\sqrt{d+e\,x^2}}-\frac{6\,e^{7/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{35\,d^{7/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 234 leaves):

$$\left(2\left(\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\left(2\sqrt{e}\,x\left(-d^2+2\,d\,e\,x^2+3\,e^2\,x^4\right)-5\,d^2\sqrt{d+e\,x^2}\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]\right)-6\sqrt{d}\,e^2\,x^4\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+6\sqrt{d}\,e^2\,x^4\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\right)\Big/\left(35\,d^2\,x^{7/2}\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\right)$$

Problem 31: Unable to integrate problem.

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^3}{1-c^2\,x^2}\,dx$$

Optimal (type 4, 409 leaves, 9 steps):

$$-\frac{2\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^3\text{ArcTanh}\left[1-\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{c}+\frac{3\,b\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2\text{PolyLog}\left[2,1-\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{2\,c}-\frac{3\,b\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2\text{PolyLog}\left[2,-1+\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{2\,c}-\frac{3\,b^2\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)\text{PolyLog}\left[3,1-\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{2\,c}+\frac{3\,b^2\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)\text{PolyLog}\left[3,-1+\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{2\,c}+\frac{3\,b^3\,\text{PolyLog}\left[4,1-\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{4\,c}-\frac{3\,b^3\,\text{PolyLog}\left[4,-1+\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{4\,c}$$

Result (type 8, 42 leaves):

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^3}{1-c^2\,x^2}\,dx$$

Problem 32: Unable to integrate problem.

$$\int \frac{\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2}{1-c^2\,x^2}\,dx$$

Optimal (type 4, 268 leaves, 7 steps):

$$-\frac{2\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2\text{ArcTanh}\left[1-\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{c}+\frac{b\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)\text{PolyLog}\left[2,1-\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{c}-\frac{b\left(a+b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)\text{PolyLog}\left[2,-1+\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{c}-\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{2\,c}+\frac{b^2\,\text{PolyLog}\left[3,-1+\frac{2}{1-\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}}\right]}{2\,c}$$

Result (type 8, 42 leaves):

$$\int \frac{\left(a + b\,\text{ArcTanh}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2}{1 - c^2\,x^2}\,dx$$

Problem 47: Result more than twice size of optimal antiderivative.

$$\int x\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^2\,dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{x\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^3}{3\,b} - \frac{\text{ArcTanh}[\text{Tanh}[a + b\,x]]^4}{12\,b^2}$$

Result (type 3, 74 leaves):

$$\frac{1}{12\,b^2}(a + b\,x)\left(-(3\,a - b\,x)\,(a + b\,x)^2 + 4\,\left(2\,a^2 + a\,b\,x - b^2\,x^2\right)\,\text{ArcTanh}[\text{Tanh}[a + b\,x]] - 6\,(a - b\,x)\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^2\right)$$

Problem 57: Result more than twice size of optimal antiderivative.

$$\int x\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^3\,dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{x\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^4}{4\,b} - \frac{\text{ArcTanh}[\text{Tanh}[a + b\,x]]^5}{20\,b^2}$$

Result (type 3, 99 leaves):

$$\frac{1}{20\,b^2}(a + b\,x)\left((4\,a - b\,x)\,(a + b\,x)^3 - 5\,(3\,a - b\,x)\,(a + b\,x)^2\,\text{ArcTanh}[\text{Tanh}[a + b\,x]] + 10\,\left(2\,a^2 + a\,b\,x - b^2\,x^2\right)\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^2 - 10\,(a - b\,x)\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^3\right)$$

Problem 71: Result more than twice size of optimal antiderivative.

$$\int x\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^4\,dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{x\,\text{ArcTanh}[\text{Tanh}[a + b\,x]]^5}{5\,b} - \frac{\text{ArcTanh}[\text{Tanh}[a + b\,x]]^6}{30\,b^2}$$

Result (type 3, 125 leaves) :

$$-\frac{1}{30\,b^2}(a+b\,x)\left((5\,a-b\,x)\,(a+b\,x)^4-6\,(4\,a-b\,x)\,(a+b\,x)^3\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]+15\,(3\,a-b\,x)\,(a+b\,x)^2\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^2-20\,\left(2\,a^2+a\,b\,x-b^2\,x^2\right)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^3+15\,(a-b\,x)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4\right)$$

Problem 78: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4}{x^6}\,dx$$

Optimal (type 3, 31 leaves, 1 step) :

$$\frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^5}{5\,x^5\,(b\,x-\text{ArcTanh}[\text{Tanh}[a+b\,x]])}$$

Result (type 3, 66 leaves) :

$$-\frac{1}{5\,x^5}\left(b^4\,x^4+b^3\,x^3\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]+b^2\,x^2\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^2+b\,x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^3+\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4\right)$$

Problem 84: Result more than twice size of optimal antiderivative.

$$\int x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^6\,dx$$

Optimal (type 3, 34 leaves, 3 steps) :

$$\frac{x\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^7}{7\,b}-\frac{\text{ArcTanh}[\text{Tanh}[a+b\,x]]^8}{56\,b^2}$$

Result (type 3, 177 leaves) :

$$-\frac{1}{56\,b^2}(a+b\,x)\left((7\,a-b\,x)\,(a+b\,x)^6-8\,(6\,a-b\,x)\,(a+b\,x)^5\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]+28\,(5\,a-b\,x)\,(a+b\,x)^4\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^2-56\,(4\,a-b\,x)\,(a+b\,x)^3\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^3+70\,(3\,a-b\,x)\,(a+b\,x)^2\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^4-56\,\left(2\,a^2+a\,b\,x-b^2\,x^2\right)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^5+28\,(a-b\,x)\,\text{ArcTanh}[\text{Tanh}[a+b\,x]]^6\right)$$

Problem 286: Result more than twice size of optimal antiderivative.

$$\int\text{ArcTanh}[c+d\,\text{Tanh}[a+b\,x]]\,dx$$

Optimal (type 4, 150 leaves, 7 steps) :

$$x\,\text{ArcTanh}[c+d\,\text{Tanh}[a+b\,x]]+\frac{1}{2}\,x\,\text{Log}\left[1+\frac{(1-c-d)\,e^{2a+2bx}}{1-c+d}\right]-\frac{1}{2}\,x\,\text{Log}\left[1+\frac{(1+c+d)\,e^{2a+2bx}}{1+c-d}\right]+\frac{\text{PolyLog}\left[2,-\frac{(1-c-d)\,e^{2a+2bx}}{1-c+d}\right]}{4\,b}-\frac{\text{PolyLog}\left[2,-\frac{(1+c+d)\,e^{2a+2bx}}{1+c-d}\right]}{4\,b}$$

Result (type 4, 366 leaves):

$$x\,\text{ArcTanh}[c+d\,\text{Tanh}[a+b\,x]]+\frac{1}{2\,b}\left((a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{-1+c+d}\,e^{a+bx}}{\sqrt{1-c+d}}\right]+(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{-1+c+d}\,e^{a+bx}}{\sqrt{1-c+d}}\right]-(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{1+c+d}\,e^{a+bx}}{\sqrt{-1-c+d}}\right]-(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{1+c+d}\,e^{a+bx}}{\sqrt{-1-c+d}}\right]+a\,\text{Log}\left[1+c-d+e^{2\,(a+bx)}+c\,e^{2\,(a+bx)}+d\,e^{2\,(a+bx)}\right]-a\,\text{Log}\left[1+d+e^{2\,(a+bx)}-d\,e^{2\,(a+bx)}-c\,\left(1+e^{2\,(a+bx)}\right)\right]+\text{PolyLog}\left[2,-\frac{\sqrt{-1+c+d}\,e^{a+bx}}{\sqrt{1-c+d}}\right]+\text{PolyLog}\left[2,\frac{\sqrt{-1+c+d}\,e^{a+bx}}{\sqrt{1-c+d}}\right]-\text{PolyLog}\left[2,-\frac{\sqrt{1+c+d}\,e^{a+bx}}{\sqrt{-1-c+d}}\right]-\text{PolyLog}\left[2,\frac{\sqrt{1+c+d}\,e^{a+bx}}{\sqrt{-1-c+d}}\right]\right)$$

Problem 291: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[1+d+d\,\text{Tanh}[a+b\,x]]\,dx$$

Optimal (type 4, 69 leaves, 5 steps):

$$\frac{b\,x^2}{2}+x\,\text{ArcTanh}[1+d+d\,\text{Tanh}[a+b\,x]]-\frac{1}{2}\,x\,\text{Log}\left[1+(1+d)\,e^{2a+2bx}\right]-\frac{\text{PolyLog}\left[2,-(1+d)\,e^{2a+2bx}\right]}{4\,b}$$

Result (type 4, 168 leaves):

$$x\,\text{ArcTanh}[1+d+d\,\text{Tanh}[a+b\,x]]-\frac{1}{2\,b}\left(b\,x\left(-b\,x-\text{Log}\left[e^{-a-bx}+(1+d)\,e^{a+bx}\right]+\text{Log}\left[1-e^{bx}\sqrt{-(1+d)\,e^{2a}}\right]+\text{Log}\left[1+e^{bx}\sqrt{-(1+d)\,e^{2a}}\right]+\text{Log}\left[(2+d)\,\text{Cosh}[a+b\,x]+d\,\text{Sinh}[a+b\,x]\right]\right)+\text{PolyLog}\left[2,-e^{bx}\sqrt{-(1+d)\,e^{2a}}\right]+\text{PolyLog}\left[2,e^{bx}\sqrt{-(1+d)\,e^{2a}}\right]\right)$$

Problem 296: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[1-d-d\,\text{Tanh}[a+b\,x]]\,dx$$

Optimal (type 4, 76 leaves, 5 steps):

$$\frac{b\,x^2}{2}+x\,\text{ArcTanh}[1-d-d\,\text{Tanh}[a+b\,x]]-\frac{1}{2}\,x\,\text{Log}\left[1+(1-d)\,e^{2a+2bx}\right]-\frac{\text{PolyLog}\left[2,-(1-d)\,e^{2a+2bx}\right]}{4\,b}$$

Result (type 4, 171 leaves):

$$x\,\text{ArcTanh}[1-d-d\,\text{Tanh}[a+b\,x]]-\frac{1}{2\,b}\left(b\,x\left(-b\,x-\text{Log}\left[e^{-a-b\,x}\left(-1+(-1+d)\,e^{2\,(a+b\,x)}\right)\right]+\text{Log}\left[1-e^{b\,x}\sqrt{(-1+d)\,e^{2\,a}}\right]+\text{Log}\left[1+e^{b\,x}\sqrt{(-1+d)\,e^{2\,a}}\right]+\text{Log}\left[(-2+d)\,\text{Cosh}[a+b\,x]+d\,\text{Sinh}[a+b\,x]\right]\right)+\text{PolyLog}\left[2,-e^{b\,x}\sqrt{(-1+d)\,e^{2\,a}}\right]+\text{PolyLog}\left[2,e^{b\,x}\sqrt{(-1+d)\,e^{2\,a}}\right]\right)$$

Problem 300: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[c+d\,\text{Coth}[a+b\,x]]\,dx$$

Optimal (type 4, 150 leaves, 7 steps):

$$x\,\text{ArcTanh}[c+d\,\text{Coth}[a+b\,x]]+\frac{1}{2}x\,\text{Log}\left[1-\frac{(1-c-d)\,e^{2\,a+2\,b\,x}}{1-c+d}\right]-\frac{1}{2}x\,\text{Log}\left[1-\frac{(1+c+d)\,e^{2\,a+2\,b\,x}}{1+c-d}\right]+\frac{\text{PolyLog}\left[2,\frac{(1-c-d)\,e^{2\,a+2\,b\,x}}{1-c+d}\right]}{4\,b}-\frac{\text{PolyLog}\left[2,\frac{(1+c+d)\,e^{2\,a+2\,b\,x}}{1+c-d}\right]}{4\,b}$$

Result (type 4, 369 leaves):

$$x\,\text{ArcTanh}[c+d\,\text{Coth}[a+b\,x]]-\frac{1}{2\,b}\left(-(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{-1+c+d}\,e^{a+b\,x}}{\sqrt{-1+c-d}}\right]-(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{-1+c+d}\,e^{a+b\,x}}{\sqrt{-1+c-d}}\right]+(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{1+c+d}\,e^{a+b\,x}}{\sqrt{1+c-d}}\right]+(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{1+c+d}\,e^{a+b\,x}}{\sqrt{1+c-d}}\right]+a\,\text{Log}\left[1+d-e^{2\,(a+b\,x)}+d\,e^{2\,(a+b\,x)}+c\left(-1+e^{2\,(a+b\,x)}\right)\right]-a\,\text{Log}\left[1+c-e^{2\,(a+b\,x)}-c\,e^{2\,(a+b\,x)}-d\left(1+e^{2\,(a+b\,x)}\right)\right]-\text{PolyLog}\left[2,-\frac{\sqrt{-1+c+d}\,e^{a+b\,x}}{\sqrt{-1+c-d}}\right]-\text{PolyLog}\left[2,\frac{\sqrt{-1+c+d}\,e^{a+b\,x}}{\sqrt{-1+c-d}}\right]+\text{PolyLog}\left[2,-\frac{\sqrt{1+c+d}\,e^{a+b\,x}}{\sqrt{1+c-d}}\right]+\text{PolyLog}\left[2,\frac{\sqrt{1+c+d}\,e^{a+b\,x}}{\sqrt{1+c-d}}\right]\right)$$

Problem 305: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[1+d+d\,\text{Coth}[a+b\,x]]\,dx$$

Optimal (type 4, 69 leaves, 5 steps):

$$\frac{b\,x^2}{2}+x\,\text{ArcTanh}[1+d+d\,\text{Coth}[a+b\,x]]-\frac{1}{2}x\,\text{Log}\left[1-(1+d)\,e^{2\,a+2\,b\,x}\right]-\frac{\text{PolyLog}\left[2,(1+d)\,e^{2\,a+2\,b\,x}\right]}{4\,b}$$

Result (type 4, 168 leaves):

$$x \operatorname{ArcTanh}[1+d+d\operatorname{Coth}[a+b x]]-\frac{1}{2 b}\left(b x\left(-b x-\operatorname{Log}\left[e^{-a-b x}\left(-1+(1+d) e^{2(a+b x)}\right)\right]+\operatorname{Log}\left[1-e^{b x}\sqrt{(1+d) e^{2 a}}\right]+\operatorname{Log}\left[1+e^{b x}\sqrt{(1+d) e^{2 a}}\right]+\operatorname{Log}[d\operatorname{Cosh}[a+b x]+(2+d)\operatorname{Sinh}[a+b x]]\right)+\operatorname{PolyLog}\left[2,-e^{b x}\sqrt{(1+d) e^{2 a}}\right]+\operatorname{PolyLog}\left[2, e^{b x}\sqrt{(1+d) e^{2 a}}\right]\right)$$

Problem 310: Result more than twice size of optimal antiderivative.

$$\int \operatorname{ArcTanh}[1-d-d\operatorname{Coth}[a+b x]]\, dx$$

Optimal (type 4, 76 leaves, 5 steps):

$$\frac{b x^2}{2}+x \operatorname{ArcTanh}[1-d-d\operatorname{Coth}[a+b x]]-\frac{1}{2} x \operatorname{Log}\left[1-(1-d) e^{2 a+2 b x}\right]-\frac{\operatorname{PolyLog}\left[2,(1-d) e^{2 a+2 b x}\right]}{4 b}$$

Result (type 4, 175 leaves):

$$x \operatorname{ArcTanh}[1-d-d\operatorname{Coth}[a+b x]]-\frac{1}{2 b}\left(b x\left(-b x-\operatorname{Log}\left[e^{-a-b x}\left(1+(-1+d) e^{2(a+b x)}\right)\right]+\operatorname{Log}\left[1-e^{b x}\sqrt{-(-1+d) e^{2 a}}\right]+\operatorname{Log}\left[1+e^{b x}\sqrt{-(-1+d) e^{2 a}}\right]+\operatorname{Log}[d\operatorname{Cosh}[a+b x]+(-2+d)\operatorname{Sinh}[a+b x]]\right)+\operatorname{PolyLog}\left[2,-e^{b x}\sqrt{-(-1+d) e^{2 a}}\right]+\operatorname{PolyLog}\left[2, e^{b x}\sqrt{-(-1+d) e^{2 a}}\right]\right)$$

Problem 312: Result more than twice size of optimal antiderivative.

$$\int (e+f x)^3 \operatorname{ArcTanh}[\operatorname{Tan}[a+b x]]\, dx$$

Optimal (type 4, 302 leaves, 12 steps):

$$\frac{i (e+f x)^4 \operatorname{ArcTan}\left[e^{2 i (a+b x)}\right]}{4 f}+\frac{(e+f x)^4 \operatorname{ArcTanh}[\operatorname{Tan}[a+b x]]}{4 f}-\frac{i (e+f x)^3 \operatorname{PolyLog}\left[2,-i e^{2 i (a+b x)}\right]}{4 b}+\frac{i (e+f x)^3 \operatorname{PolyLog}\left[2, i e^{2 i (a+b x)}\right]}{4 b}+\frac{3 f (e+f x)^2 \operatorname{PolyLog}\left[3,-i e^{2 i (a+b x)}\right]}{8 b^2}-\frac{3 f (e+f x)^2 \operatorname{PolyLog}\left[3, i e^{2 i (a+b x)}\right]}{8 b^2}+\frac{3 i f^2 (e+f x) \operatorname{PolyLog}\left[4,-i e^{2 i (a+b x)}\right]}{8 b^3}-\frac{3 i f^2 (e+f x) \operatorname{PolyLog}\left[4, i e^{2 i (a+b x)}\right]}{8 b^3}-\frac{3 f^3 \operatorname{PolyLog}\left[5,-i e^{2 i (a+b x)}\right]}{16 b^4}+\frac{3 f^3 \operatorname{PolyLog}\left[5, i e^{2 i (a+b x)}\right]}{16 b^4}$$

Result (type 4, 654 leaves):

$$\frac{1}{4} x \left(4 e^3 + 6 e^2 f x + 4 e f^2 x^2 + f^3 x^3\right) \text{ArcTanh}[\text{Tan}[a + b x]] +$$
$$\frac{1}{16 b^4} \Big(-8 b^4 e^3 x \text{Log}\left[1 - i e^{2 i (a+b x)}\right] - 12 b^4 e^2 f x^2 \text{Log}\left[1 - i e^{2 i (a+b x)}\right] - 8 b^4 e f^2 x^3 \text{Log}\left[1 - i e^{2 i (a+b x)}\right] -$$
$$2 b^4 f^3 x^4 \text{Log}\left[1 - i e^{2 i (a+b x)}\right] + 8 b^4 e^3 x \text{Log}\left[1 + i e^{2 i (a+b x)}\right] + 12 b^4 e^2 f x^2 \text{Log}\left[1 + i e^{2 i (a+b x)}\right] + 8 b^4 e f^2 x^3 \text{Log}\left[1 + i e^{2 i (a+b x)}\right] +$$
$$2 b^4 f^3 x^4 \text{Log}\left[1 + i e^{2 i (a+b x)}\right] - 4 i b^3 (e + f x)^3 \text{PolyLog}\left[2, -i e^{2 i (a+b x)}\right] + 4 i b^3 (e + f x)^3 \text{PolyLog}\left[2, i e^{2 i (a+b x)}\right] +$$
$$6 b^2 e^2 f \text{PolyLog}\left[3, -i e^{2 i (a+b x)}\right] + 12 b^2 e f^2 x \text{PolyLog}\left[3, -i e^{2 i (a+b x)}\right] + 6 b^2 f^3 x^2 \text{PolyLog}\left[3, -i e^{2 i (a+b x)}\right] -$$
$$6 b^2 e^2 f \text{PolyLog}\left[3, i e^{2 i (a+b x)}\right] - 12 b^2 e f^2 x \text{PolyLog}\left[3, i e^{2 i (a+b x)}\right] - 6 b^2 f^3 x^2 \text{PolyLog}\left[3, i e^{2 i (a+b x)}\right] +$$
$$6 i b e f^2 \text{PolyLog}\left[4, -i e^{2 i (a+b x)}\right] + 6 i b f^3 x \text{PolyLog}\left[4, -i e^{2 i (a+b x)}\right] - 6 i b e f^2 \text{PolyLog}\left[4, i e^{2 i (a+b x)}\right] -$$
$$6 i b f^3 x \text{PolyLog}\left[4, i e^{2 i (a+b x)}\right] - 3 f^3 \text{PolyLog}\left[5, -i e^{2 i (a+b x)}\right] + 3 f^3 \text{PolyLog}\left[5, i e^{2 i (a+b x)}\right]\Big)$$

Problem 319: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTanh}[c + d \text{Tan}[a + b x]] \, dx$$

Optimal (type 4, 194 leaves, 7 steps):

$$x \text{ArcTanh}[c + d \text{Tan}[a + b x]] + \frac{1}{2} x \text{Log}\left[1 + \frac{(1 - c + i d) e^{2 i a + 2 i b x}}{1 - c - i d}\right] -$$
$$\frac{1}{2} x \text{Log}\left[1 + \frac{(1 + c - i d) e^{2 i a + 2 i b x}}{1 + c + i d}\right] - \frac{i \text{PolyLog}\left[2, -\frac{(1-c+i d) e^{2 i a+2 i b x}}{1-c-i d}\right]}{4 b} + \frac{i \text{PolyLog}\left[2, -\frac{(1+c-i d) e^{2 i a+2 i b x}}{1+c+i d}\right]}{4 b}$$

Result (type 4, 4654 leaves):

$$x \text{ArcTanh}[c + d \text{Tan}[a + b x]] +$$
$$\Bigg(d \Bigg(-a \text{Log}\left[-\text{Sec}\left[\frac{1}{2} (a + b x)\right]^2 ((-1 + c) \text{Cos}[a + b x] + d \text{Sin}[a + b x])\right] + a \text{Log}\left[\text{Sec}\left[\frac{1}{2} (a + b x)\right]^2 (\text{Cos}[a + b x] + c \text{Cos}[a + b x] + d \text{Sin}[a + b x])\right] +$$
$$(a + b x) \text{Log}\left[\frac{-d + \sqrt{1 - 2 c + c^2 + d^2}}{-1 + c} + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right] +$$
$$i \text{Log}\left[\frac{(-1 + c) \left(1 + i \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right)}{-1 + c + i d - i \sqrt{1 - 2 c + c^2 + d^2}}\right] \text{Log}\left[\frac{-d + \sqrt{1 - 2 c + c^2 + d^2}}{-1 + c} + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right] - i \text{Log}\left[-\frac{(-1 + c) \left(i + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right)}{i - i c - d + \sqrt{1 - 2 c + c^2 + d^2}}\right]$$
$$\text{Log}\left[\frac{-d + \sqrt{1 - 2 c + c^2 + d^2}}{-1 + c} + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right] + (a + b x) \text{Log}\left[\frac{d + \sqrt{1 - 2 c + c^2 + d^2}}{1 - c} + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right] +$$
$$i \text{Log}\left[\frac{(-1 + c) \left(-i + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right)}{i - i c + d + \sqrt{1 - 2 c + c^2 + d^2}}\right] \text{Log}\left[\frac{d + \sqrt{1 - 2 c + c^2 + d^2}}{1 - c} + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right] - i \text{Log}\left[\frac{(-1 + c) \left(i + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right)}{-i + i c + d + \sqrt{1 - 2 c + c^2 + d^2}}\right]$$
$$\text{Log}\left[\frac{d + \sqrt{1 - 2 c + c^2 + d^2}}{1 - c} + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right] - (a + b x) \text{Log}\left[-\frac{d + \sqrt{1 + 2 c + c^2 + d^2}}{1 + c} + \text{Tan}\left[\frac{1}{2} (a + b x)\right]\right] -$$

$$\mathrm{i}\,\mathrm{Log}\Big[\frac{(1+c)\left(-\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{-\mathrm{i}-\mathrm{i}\,c+d+\sqrt{1+2\,c+c^2+d^2}}\Big]\,\mathrm{Log}\Big[-\frac{d+\sqrt{1+2\,c+c^2+d^2}}{1+c}+\mathrm{Tan}\Big[\frac{1}{2}(a+b\,x)\Big]\Big]+\mathrm{i}\,\mathrm{Log}\Big[\frac{(1+c)\left(\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{\mathrm{i}+\mathrm{i}\,c+d+\sqrt{1+2\,c+c^2+d^2}}\Big]$$

$$\mathrm{Log}\Big[-\frac{d+\sqrt{1+2\,c+c^2+d^2}}{1+c}+\mathrm{Tan}\Big[\frac{1}{2}(a+b\,x)\Big]\Big]-(a+b\,x)\,\mathrm{Log}\Big[\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{1+c}\Big]+$$

$$\mathrm{i}\,\mathrm{Log}\Big[\frac{(1+c)\left(1-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{1+c-\mathrm{i}\,d+\mathrm{i}\sqrt{1+2\,c+c^2+d^2}}\Big]\,\mathrm{Log}\Big[\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{1+c}\Big]-$$

$$\mathrm{i}\,\mathrm{Log}\Big[\frac{(1+c)\left(1+\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{1+c+\mathrm{i}\,d-\mathrm{i}\sqrt{1+2\,c+c^2+d^2}}\Big]\,\mathrm{Log}\Big[\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{1+c}\Big]+$$

$$\mathrm{i}\,\mathrm{PolyLog}\Big[2,\frac{d+\sqrt{1-2\,c+c^2+d^2}-(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{\mathrm{i}-\mathrm{i}\,c+d+\sqrt{1-2\,c+c^2+d^2}}\Big]-\mathrm{i}\,\mathrm{PolyLog}\Big[2,\frac{d+\sqrt{1-2\,c+c^2+d^2}-(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{-\mathrm{i}+\mathrm{i}\,c+d+\sqrt{1-2\,c+c^2+d^2}}\Big]-$$

$$\mathrm{i}\,\mathrm{PolyLog}\Big[2,\frac{-d+\sqrt{1-2\,c+c^2+d^2}+(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{\mathrm{i}-\mathrm{i}\,c-d+\sqrt{1-2\,c+c^2+d^2}}\Big]+\mathrm{i}\,\mathrm{PolyLog}\Big[2,\frac{-d+\sqrt{1-2\,c+c^2+d^2}+(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{-\mathrm{i}+\mathrm{i}\,c-d+\sqrt{1-2\,c+c^2+d^2}}\Big]-$$

$$\mathrm{i}\,\mathrm{PolyLog}\Big[2,\frac{d+\sqrt{1+2\,c+c^2+d^2}-(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{-\mathrm{i}-\mathrm{i}\,c+d+\sqrt{1+2\,c+c^2+d^2}}\Big]+\mathrm{i}\,\mathrm{PolyLog}\Big[2,\frac{d+\sqrt{1+2\,c+c^2+d^2}-(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{\mathrm{i}+\mathrm{i}\,c+d+\sqrt{1+2\,c+c^2+d^2}}\Big]+$$

$$\mathrm{i}\,\mathrm{PolyLog}\Big[2,\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{-\mathrm{i}-\mathrm{i}\,c-d+\sqrt{1+2\,c+c^2+d^2}}\Big]-\mathrm{i}\,\mathrm{PolyLog}\Big[2,\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{\mathrm{i}+\mathrm{i}\,c-d+\sqrt{1+2\,c+c^2+d^2}}\Big]\Bigg)$$

$$\Big(-\Big((2\,a)\,/\,\Big(b\,\Big(-1+c^2+d^2-\mathrm{Cos}[2\,(a+b\,x)]+c^2\,\mathrm{Cos}[2\,(a+b\,x)]-d^2\,\mathrm{Cos}[2\,(a+b\,x)]+2\,c\,d\,\mathrm{Sin}[2\,(a+b\,x)]\Big)\Big)\Big)+$$

$$(2\,(a+b\,x))\,/\,\Big(b\,\Big(-1+c^2+d^2-\mathrm{Cos}[2\,(a+b\,x)]+c^2\,\mathrm{Cos}[2\,(a+b\,x)]-d^2\,\mathrm{Cos}[2\,(a+b\,x)]+2\,c\,d\,\mathrm{Sin}[2\,(a+b\,x)]\Big)\Big)\Big)\Big/$$

$$\Bigg(\mathrm{Log}\Big[\frac{-d+\sqrt{1-2\,c+c^2+d^2}}{-1+c}+\mathrm{Tan}\Big[\frac{1}{2}(a+b\,x)\Big]\Big]+\mathrm{Log}\Big[\frac{d+\sqrt{1-2\,c+c^2+d^2}}{1-c}+\mathrm{Tan}\Big[\frac{1}{2}(a+b\,x)\Big]\Big]-$$

$$\mathrm{Log}\Big[-\frac{d+\sqrt{1+2\,c+c^2+d^2}}{1+c}+\mathrm{Tan}\Big[\frac{1}{2}(a+b\,x)\Big]\Big]-\mathrm{Log}\Big[\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{1+c}\Big]+$$

$$\frac{\mathrm{Log}\Big[\frac{-d+\sqrt{1+2\,c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{1+c}\Big]\,\mathrm{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(1-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-\frac{\mathrm{Log}\Big[\frac{-d+\sqrt{1-2\,c+c^2+d^2}}{-1+c}+\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]\Big]\,\mathrm{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(1+\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+$$

$$\frac{\text{Log}\left[\frac{-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{1+c}\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(1+i\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+\frac{i\,\text{Log}\left[\frac{d+\sqrt{1-2c+c^2+d^2}}{1-c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(-i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-$$

$$\frac{i\,\text{Log}\left[-\frac{d+\sqrt{1+2c+c^2+d^2}}{1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(-i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-\frac{i\,\text{Log}\left[\frac{-d+\sqrt{1-2c+c^2+d^2}}{-1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-$$

$$\frac{i\,\text{Log}\left[\frac{d+\sqrt{1-2c+c^2+d^2}}{1-c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+\frac{i\,\text{Log}\left[-\frac{d+\sqrt{1+2c+c^2+d^2}}{1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+$$

$$\frac{(a+b\,x)\,\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(\frac{-d+\sqrt{1-2c+c^2+d^2}}{-1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+\frac{i\,\text{Log}\left[\frac{(-1+c)\left(1+i\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{-1+c+i\,d-i\sqrt{1-2c+c^2+d^2}}\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(\frac{-d+\sqrt{1-2c+c^2+d^2}}{-1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-$$

$$\frac{i\,\text{Log}\left[-\frac{(-1+c)\left(i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{i-i\,c-d+\sqrt{1-2c+c^2+d^2}}\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(\frac{-d+\sqrt{1-2c+c^2+d^2}}{-1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+\frac{(a+b\,x)\,\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(\frac{d+\sqrt{1-2c+c^2+d^2}}{1-c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+$$

$$\frac{i\,\text{Log}\left[\frac{(-1+c)\left(-i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{i-i\,c+d+\sqrt{1-2c+c^2+d^2}}\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(\frac{d+\sqrt{1-2c+c^2+d^2}}{1-c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-\frac{i\,\text{Log}\left[\frac{(-1+c)\left(i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{-i+i\,c+d+\sqrt{1-2c+c^2+d^2}}\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(\frac{d+\sqrt{1-2c+c^2+d^2}}{1-c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-$$

$$\frac{(a+b\,x)\,\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(-\frac{d+\sqrt{1+2c+c^2+d^2}}{1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-\frac{i\,\text{Log}\left[\frac{(1+c)\left(-i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{-i-i\,c+d+\sqrt{1+2c+c^2+d^2}}\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(-\frac{d+\sqrt{1+2c+c^2+d^2}}{1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+$$

$$\frac{i\,\text{Log}\left[\frac{(1+c)\left(i+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}{i+i\,c+d+\sqrt{1+2c+c^2+d^2}}\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(-\frac{d+\sqrt{1+2c+c^2+d^2}}{1+c}+\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}+\frac{i\,(-1+c)\,\text{Log}\left[1-\frac{d+\sqrt{1-2c+c^2+d^2}-(-1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]}{i-i\,c+d+\sqrt{1-2c+c^2+d^2}}\right]\text{Sec}\left[\frac{1}{2}(a+b\,x)\right]^2}{2\left(d+\sqrt{1-2c+c^2+d^2}-(-1+c)\,\text{Tan}\left[\frac{1}{2}(a+b\,x)\right]\right)}-$$

$$\frac{i\,(-1+c)\,\mathrm{Log}\left[1-\frac{d+\sqrt{1-2c+c^2+d^2}-(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]}{-i+i\,c+d+\sqrt{1-2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(d+\sqrt{1-2c+c^2+d^2}-(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i\,(-1+c)\,\mathrm{Log}\left[1-\frac{-d+\sqrt{1-2c+c^2+d^2}+(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]}{i-i\,c-d+\sqrt{1-2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-d+\sqrt{1-2c+c^2+d^2}+(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i\,(-1+c)\,\mathrm{Log}\left[1-\frac{-d+\sqrt{1-2c+c^2+d^2}+(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]}{-i+i\,c-d+\sqrt{1-2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-d+\sqrt{1-2c+c^2+d^2}+(-1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i\,(1+c)\,\mathrm{Log}\left[1-\frac{d+\sqrt{1+2c+c^2+d^2}-(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]}{-i-i\,c+d+\sqrt{1+2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(d+\sqrt{1+2c+c^2+d^2}-(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i\,(1+c)\,\mathrm{Log}\left[1-\frac{d+\sqrt{1+2c+c^2+d^2}-(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]}{i+i\,c+d+\sqrt{1+2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(d+\sqrt{1+2c+c^2+d^2}-(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{(1+c)\,(a+b x)\,\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i\,(1+c)\,\mathrm{Log}\left[\frac{(1+c)\left(1-i\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{1+c-i\,d+i\sqrt{1+2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i\,(1+c)\,\mathrm{Log}\left[\frac{(1+c)\left(1+i\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{1+c+i\,d-i\sqrt{1+2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-\frac{i\,(1+c)\,\mathrm{Log}\left[1-\frac{-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]}{-i-i\,c-d+\sqrt{1+2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+$$

$$\frac{i\,(1+c)\,\mathrm{Log}\left[1-\frac{-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]}{i+i\,c-d+\sqrt{1+2c+c^2+d^2}}\right]\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2\left(-d+\sqrt{1+2c+c^2+d^2}+(1+c)\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\Bigg(a\,\mathrm{Cos}\left[\frac{1}{2}(a+b x)\right]^2$$

$$\left(-\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2(d\,\mathrm{Cos}[a+b x]-(-1+c)\,\mathrm{Sin}[a+b x])-\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2((-1+c)\,\mathrm{Cos}[a+b x]+d\,\mathrm{Sin}[a+b x])\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\right)\Bigg)\Big/$$

$$((-1+c)\,\mathrm{Cos}[a+b x]+d\,\mathrm{Sin}[a+b x])+\Bigg(a\,\mathrm{Cos}\left[\frac{1}{2}(a+b x)\right]^2\Bigg(\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2(d\,\mathrm{Cos}[a+b x]-\mathrm{Sin}[a+b x]-c\,\mathrm{Sin}[a+b x])+$$

$$\mathrm{Sec}\left[\frac{1}{2}(a+b x)\right]^2(\mathrm{Cos}[a+b x]+c\,\mathrm{Cos}[a+b x]+d\,\mathrm{Sin}[a+b x])\,\mathrm{Tan}\left[\frac{1}{2}(a+b x)\right]\Bigg)\Bigg)\Big/(\mathrm{Cos}[a+b x]+c\,\mathrm{Cos}[a+b x]+d\,\mathrm{Sin}[a+b x])\Bigg)$$

Problem 329: Result more than twice size of optimal antiderivative.

$$\int (e+f x)^3 \operatorname{ArcTanh}[\operatorname{Cot}[a+b x]] \, dx$$

Optimal (type 4, 302 leaves, 12 steps):

$$\frac{i (e+f x)^4 \operatorname{ArcTan}\left[e^{2 i (a+b x)}\right]}{4 f}+\frac{(e+f x)^4 \operatorname{ArcTanh}[\operatorname{Cot}[a+b x]]}{4 f}-\frac{i (e+f x)^3 \operatorname{PolyLog}\left[2,-i e^{2 i (a+b x)}\right]}{4 b}+\frac{i (e+f x)^3 \operatorname{PolyLog}\left[2, i e^{2 i (a+b x)}\right]}{4 b}+\frac{3 f (e+f x)^2 \operatorname{PolyLog}\left[3,-i e^{2 i (a+b x)}\right]}{8 b^2}-\frac{3 f (e+f x)^2 \operatorname{PolyLog}\left[3, i e^{2 i (a+b x)}\right]}{8 b^2}+\frac{3 i f^2 (e+f x) \operatorname{PolyLog}\left[4,-i e^{2 i (a+b x)}\right]}{8 b^3}-\frac{3 i f^2 (e+f x) \operatorname{PolyLog}\left[4, i e^{2 i (a+b x)}\right]}{8 b^3}-\frac{3 f^3 \operatorname{PolyLog}\left[5,-i e^{2 i (a+b x)}\right]}{16 b^4}+\frac{3 f^3 \operatorname{PolyLog}\left[5, i e^{2 i (a+b x)}\right]}{16 b^4}$$

Result (type 4, 654 leaves):

$$\frac{1}{4} x \left(4 e^3+6 e^2 f x+4 e f^2 x^2+f^3 x^3\right) \operatorname{ArcTanh}[\operatorname{Cot}[a+b x]]+\frac{1}{16 b^4}\left(-8 b^4 e^3 x \operatorname{Log}\left[1-i e^{2 i (a+b x)}\right]-12 b^4 e^2 f x^2 \operatorname{Log}\left[1-i e^{2 i (a+b x)}\right]-8 b^4 e f^2 x^3 \operatorname{Log}\left[1-i e^{2 i (a+b x)}\right]-2 b^4 f^3 x^4 \operatorname{Log}\left[1-i e^{2 i (a+b x)}\right]+8 b^4 e^3 x \operatorname{Log}\left[1+i e^{2 i (a+b x)}\right]+12 b^4 e^2 f x^2 \operatorname{Log}\left[1+i e^{2 i (a+b x)}\right]+8 b^4 e f^2 x^3 \operatorname{Log}\left[1+i e^{2 i (a+b x)}\right]+2 b^4 f^3 x^4 \operatorname{Log}\left[1+i e^{2 i (a+b x)}\right]-4 i b^3 (e+f x)^3 \operatorname{PolyLog}\left[2,-i e^{2 i (a+b x)}\right]+4 i b^3 (e+f x)^3 \operatorname{PolyLog}\left[2, i e^{2 i (a+b x)}\right]+6 b^2 e^2 f \operatorname{PolyLog}\left[3,-i e^{2 i (a+b x)}\right]+12 b^2 e f^2 x \operatorname{PolyLog}\left[3,-i e^{2 i (a+b x)}\right]+6 b^2 f^3 x^2 \operatorname{PolyLog}\left[3,-i e^{2 i (a+b x)}\right]-6 b^2 e^2 f \operatorname{PolyLog}\left[3, i e^{2 i (a+b x)}\right]-12 b^2 e f^2 x \operatorname{PolyLog}\left[3, i e^{2 i (a+b x)}\right]-6 b^2 f^3 x^2 \operatorname{PolyLog}\left[3, i e^{2 i (a+b x)}\right]+6 i b e f^2 \operatorname{PolyLog}\left[4,-i e^{2 i (a+b x)}\right]+6 i b f^3 x \operatorname{PolyLog}\left[4,-i e^{2 i (a+b x)}\right]-6 i b e f^2 \operatorname{PolyLog}\left[4, i e^{2 i (a+b x)}\right]-6 i b f^3 x \operatorname{PolyLog}\left[4, i e^{2 i (a+b x)}\right]-3 f^3 \operatorname{PolyLog}\left[5,-i e^{2 i (a+b x)}\right]+3 f^3 \operatorname{PolyLog}\left[5, i e^{2 i (a+b x)}\right]\right)$$

Problem 336: Result more than twice size of optimal antiderivative.

$$\int \operatorname{ArcTanh}[c+d \operatorname{Cot}[a+b x]] \, dx$$

Optimal (type 4, 194 leaves, 7 steps):

$$x \operatorname{ArcTanh}[c+d \operatorname{Cot}[a+b x]]+\frac{1}{2} x \operatorname{Log}\left[1-\frac{(1-c-i d) e^{2 i a+2 i b x}}{1-c+i d}\right]-\frac{1}{2} x \operatorname{Log}\left[1-\frac{(1+c+i d) e^{2 i a+2 i b x}}{1+c-i d}\right]-\frac{i \operatorname{PolyLog}\left[2, \frac{(1-c-i d) e^{2 i a+2 i b x}}{1-c+i d}\right]}{4 b}+\frac{i \operatorname{PolyLog}\left[2, \frac{(1+c+i d) e^{2 i a+2 i b x}}{1+c-i d}\right]}{4 b}$$

Result (type 4, 4463 leaves):

$$x \operatorname{ArcTanh}[c+d \operatorname{Cot}[a+b x]]-\left(d \left(a \operatorname{Log}\left[-\operatorname{Sec}\left[\frac{1}{2} (a+b x)\right]^2 (d \operatorname{Cos}[a+b x]+(-1+c) \operatorname{Sin}[a+b x])\right]-a \operatorname{Log}\left[-\operatorname{Sec}\left[\frac{1}{2} (a+b x)\right]^2 (d \operatorname{Cos}[a+b x]+\operatorname{Sin}[a+b x]+c \operatorname{Sin}[a+b x])\right]-\right.\right.$$

$$\left(a+b\,x\right)\mathrm{Log}\left[-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right]-$$

$$\mathrm{i}\,\mathrm{Log}\left[\frac{d\left(-\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right)}{-1+c-\mathrm{i}\,d+\sqrt{1-2\,c+c^2+d^2}}\right]\mathrm{Log}\left[-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right]+\mathrm{i}\,\mathrm{Log}\left[\frac{d\left(\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right)}{-1+c+\mathrm{i}\,d+\sqrt{1-2\,c+c^2+d^2}}\right]$$

$$\mathrm{Log}\left[-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right]+\left(a+b\,x\right)\mathrm{Log}\left[-\frac{1+c+\sqrt{1+2\,c+c^2+d^2}}{d}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right]+$$

$$\mathrm{i}\,\mathrm{Log}\left[\frac{d\left(-\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right)}{1+c-\mathrm{i}\,d+\sqrt{1+2\,c+c^2+d^2}}\right]\mathrm{Log}\left[-\frac{1+c+\sqrt{1+2\,c+c^2+d^2}}{d}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right]-\mathrm{i}\,\mathrm{Log}\left[\frac{d\left(\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right)}{1+c+\mathrm{i}\,d+\sqrt{1+2\,c+c^2+d^2}}\right]$$

$$\mathrm{Log}\left[-\frac{1+c+\sqrt{1+2\,c+c^2+d^2}}{d}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right]-\left(a+b\,x\right)\mathrm{Log}\left[\frac{1-c+\sqrt{1-2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{d}\right]-$$

$$\mathrm{i}\,\mathrm{Log}\left[-\frac{d\left(-\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right)}{1-c+\mathrm{i}\,d+\sqrt{1-2\,c+c^2+d^2}}\right]\mathrm{Log}\left[\frac{1-c+\sqrt{1-2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{d}\right]+\mathrm{i}\,\mathrm{Log}\left[-\frac{d\left(\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right)}{1-c-\mathrm{i}\,d+\sqrt{1-2\,c+c^2+d^2}}\right]$$

$$\mathrm{Log}\left[\frac{1-c+\sqrt{1-2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{d}\right]+\left(a+b\,x\right)\mathrm{Log}\left[\frac{-1-c+\sqrt{1+2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{d}\right]+$$

$$\mathrm{i}\,\mathrm{Log}\left[-\frac{d\left(-\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right)}{-1-c+\mathrm{i}\,d+\sqrt{1+2\,c+c^2+d^2}}\right]\mathrm{Log}\left[\frac{-1-c+\sqrt{1+2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{d}\right]-$$

$$\mathrm{i}\,\mathrm{Log}\left[-\frac{d\left(\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]\right)}{-1-c-\mathrm{i}\,d+\sqrt{1+2\,c+c^2+d^2}}\right]\mathrm{Log}\left[\frac{-1-c+\sqrt{1+2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{d}\right]-$$

$$\mathrm{i}\,\mathrm{PolyLog}\left[2,\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{-1+c-\mathrm{i}\,d+\sqrt{1-2\,c+c^2+d^2}}\right]+\mathrm{i}\,\mathrm{PolyLog}\left[2,\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{-1+c+\mathrm{i}\,d+\sqrt{1-2\,c+c^2+d^2}}\right]-$$

$$\mathrm{i}\,\mathrm{PolyLog}\left[2,\frac{1+c-\sqrt{1+2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{1+c+\mathrm{i}\,d-\sqrt{1+2\,c+c^2+d^2}}\right]+\mathrm{i}\,\mathrm{PolyLog}\left[2,\frac{1+c+\sqrt{1+2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{1+c-\mathrm{i}\,d+\sqrt{1+2\,c+c^2+d^2}}\right]-$$

$$\mathrm{i}\,\mathrm{PolyLog}\left[2,\frac{1+c+\sqrt{1+2\,c+c^2+d^2}-d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{1+c+\mathrm{i}\,d+\sqrt{1+2\,c+c^2+d^2}}\right]+\mathrm{i}\,\mathrm{PolyLog}\left[2,\frac{1-c+\sqrt{1-2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{1-c-\mathrm{i}\,d+\sqrt{1-2\,c+c^2+d^2}}\right]-$$

$$\mathrm{i}\,\mathrm{PolyLog}\left[2,\frac{1-c+\sqrt{1-2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{1-c+\mathrm{i}\,d+\sqrt{1-2\,c+c^2+d^2}}\right]+\mathrm{i}\,\mathrm{PolyLog}\left[2,\frac{-1-c+\sqrt{1+2\,c+c^2+d^2}+d\,\mathrm{Tan}\left[\frac{1}{2}\left(a+b\,x\right)\right]}{-1-c+\mathrm{i}\,d+\sqrt{1+2\,c+c^2+d^2}}\right]\Bigg)$$

$$\Bigg(\frac{2\,a}{b\left(1-c^2-d^2-\mathrm{Cos}\left[2\left(a+b\,x\right)\right]+c^2\,\mathrm{Cos}\left[2\left(a+b\,x\right)\right]-d^2\,\mathrm{Cos}\left[2\left(a+b\,x\right)\right]-2\,c\,d\,\mathrm{Sin}\left[2\left(a+b\,x\right)\right]\right)}-$$

$$\left.\left.\frac{2\,(a+b\,x)}{b\,\left(1-c^2-d^2-\text{Cos}[2\,(a+b\,x)]+c^2\,\text{Cos}[2\,(a+b\,x)]-d^2\,\text{Cos}[2\,(a+b\,x)]-2\,c\,d\,\text{Sin}[2\,(a+b\,x)]\right)}\right)\right)\Big/$$

$$\left(-\text{Log}\left[-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right]+\text{Log}\left[-\frac{1+c+\sqrt{1+2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right]-\right.$$

$$\text{Log}\left[\frac{1-c+\sqrt{1-2\,c+c^2+d^2}+d\,\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{d}\right]+\text{Log}\left[\frac{-1-c+\sqrt{1+2\,c+c^2+d^2}+d\,\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{d}\right]-$$

$$\frac{i\,\text{Log}\left[-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(-i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}+\frac{i\,\text{Log}\left[-\frac{1+c+\sqrt{1+2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(-i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}-$$

$$\frac{i\,\text{Log}\left[\frac{1-c+\sqrt{1-2\,c+c^2+d^2}+d\,\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{d}\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(-i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}+\frac{i\,\text{Log}\left[\frac{-1-c+\sqrt{1+2\,c+c^2+d^2}+d\,\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{d}\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(-i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}+$$

$$\frac{i\,\text{Log}\left[-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}-\frac{i\,\text{Log}\left[-\frac{1+c+\sqrt{1+2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}+$$

$$\frac{i\,\text{Log}\left[\frac{1-c+\sqrt{1-2\,c+c^2+d^2}+d\,\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{d}\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}-\frac{i\,\text{Log}\left[\frac{-1-c+\sqrt{1+2\,c+c^2+d^2}+d\,\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]}{d}\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}-$$

$$\frac{(a+b\,x)\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}-\frac{i\,\text{Log}\left[\frac{d\,\left(-i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}{-1+c-i\,d+\sqrt{1-2\,c+c^2+d^2}}\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}+$$

$$\frac{i\,\text{Log}\left[\frac{d\,\left(i+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}{-1+c+i\,d+\sqrt{1-2\,c+c^2+d^2}}\right]\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(-\frac{-1+c+\sqrt{1-2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}+\frac{(a+b\,x)\,\text{Sec}\left[\frac{1}{2}\,(a+b\,x)\right]^2}{2\,\left(-\frac{1+c+\sqrt{1+2\,c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}\,(a+b\,x)\right]\right)}+$$

$$\frac{i \,\text{Log}\left[\frac{d \left(-i+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{1+c-i d+\sqrt{1+2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(-\frac{1+c+\sqrt{1+2 c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-\frac{i \,\text{Log}\left[\frac{d \left(i+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{1+c+i d+\sqrt{1+2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(-\frac{1+c+\sqrt{1+2 c+c^2+d^2}}{d}+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i d \,\text{Log}\left[1-\frac{-1+c+\sqrt{1-2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{-1+c-i d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(-1+c+\sqrt{1-2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i d \,\text{Log}\left[1-\frac{-1+c+\sqrt{1-2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{-1+c+i d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(-1+c+\sqrt{1-2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i d \,\text{Log}\left[1-\frac{1+c-\sqrt{1+2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{1+c+i d-\sqrt{1+2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(1+c-\sqrt{1+2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i d \,\text{Log}\left[1-\frac{1+c+\sqrt{1+2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{1+c-i d+\sqrt{1+2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(1+c+\sqrt{1+2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i d \,\text{Log}\left[1-\frac{1+c+\sqrt{1+2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{1+c+i d+\sqrt{1+2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(1+c+\sqrt{1+2 c+c^2+d^2}-d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-\frac{d (a+b x) \,\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(1-c+\sqrt{1-2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i d \,\text{Log}\left[-\frac{d \left(-i+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{1-c+i d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(1-c+\sqrt{1-2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i d \,\text{Log}\left[-\frac{d \left(i+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{1-c-i d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(1-c+\sqrt{1-2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i d \,\text{Log}\left[1-\frac{1-c+\sqrt{1-2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{1-c-i d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(1-c+\sqrt{1-2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i d \,\text{Log}\left[1-\frac{1-c+\sqrt{1-2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{1-c+i d+\sqrt{1-2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(1-c+\sqrt{1-2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+$$

$$\frac{d (a+b x) \,\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(-1-c+\sqrt{1+2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}+\frac{i d \,\text{Log}\left[-\frac{d \left(-i+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{-1-c+i d+\sqrt{1+2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(-1-c+\sqrt{1+2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-$$

$$\frac{i d \,\text{Log}\left[-\frac{d \left(i+\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}{-1-c-i d+\sqrt{1+2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(-1-c+\sqrt{1+2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-\frac{i d \,\text{Log}\left[1-\frac{-1-c+\sqrt{1+2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]}{-1-c+i d+\sqrt{1+2 c+c^2+d^2}}\right] \text{Sec}\left[\frac{1}{2}(a+b x)\right]^2}{2 \left(-1-c+\sqrt{1+2 c+c^2+d^2}+d \,\text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)}-\Bigg(a \,\text{Cos}\left[\frac{1}{2}(a+b x)\right]^2$$

$$\left(-\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2 \left((-1+c) \,\text{Cos}[a+b x]-d \,\text{Sin}[a+b x]\right)-\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2 \left(d \,\text{Cos}[a+b x]+(-1+c) \,\text{Sin}[a+b x]\right) \text{Tan}\left[\frac{1}{2}(a+b x)\right]\right)\Bigg)\Big/$$

$$\left(d \,\text{Cos}[a+b x]+(-1+c) \,\text{Sin}[a+b x]\right)+\Bigg(a \,\text{Cos}\left[\frac{1}{2}(a+b x)\right]^2 \Bigg(-\text{Sec}\left[\frac{1}{2}(a+b x)\right]^2 \left(\text{Cos}[a+b x]+c \,\text{Cos}[a+b x]-d \,\text{Sin}[a+b x]\right)-$$

$$\left.\left.\operatorname{Sec}\left[\frac{1}{2}(a+b x)\right]^2 (d \operatorname{Cos}[a+b x]+\operatorname{Sin}[a+b x]+c \operatorname{Sin}[a+b x]) \operatorname{Tan}\left[\frac{1}{2}(a+b x)\right]\right)\right) \Big/ (d \operatorname{Cos}[a+b x]+\operatorname{Sin}[a+b x]+c \operatorname{Sin}[a+b x])$$

Problem 346: Result more than twice size of optimal antiderivative.

$$\int \operatorname{ArcTanh}\left[e^x\right] dx$$

Optimal (type 4, 21 leaves, 2 steps):

$$-\frac{1}{2} \operatorname{PolyLog}\left[2,-e^x\right]+\frac{1}{2} \operatorname{PolyLog}\left[2, e^x\right]$$

Result (type 4, 46 leaves):

$$x \operatorname{ArcTanh}\left[e^x\right]+\frac{1}{2}\left(-x\left(-\operatorname{Log}\left[1-e^x\right]+\operatorname{Log}\left[1+e^x\right]\right)-\operatorname{PolyLog}\left[2,-e^x\right]+\operatorname{PolyLog}\left[2, e^x\right]\right)$$

Problem 361: Result unnecessarily involves higher level functions.

$$\int \frac{(a+b \operatorname{ArcTanh}[c x^n])(d+e \operatorname{Log}[f x^m])}{x} dx$$

Optimal (type 4, 136 leaves, 11 steps):

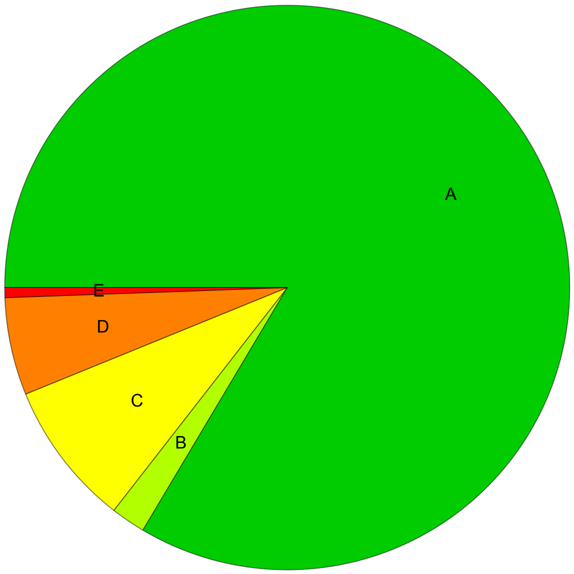
$$a d \operatorname{Log}[x]+\frac{a e \operatorname{Log}[f x^m]^2}{2 m}-\frac{b d \operatorname{PolyLog}[2,-c x^n]}{2 n}-\frac{b e \operatorname{Log}[f x^m] \operatorname{PolyLog}[2,-c x^n]}{2 n}+\frac{b d \operatorname{PolyLog}[2, c x^n]}{2 n}+\frac{b e \operatorname{Log}[f x^m] \operatorname{PolyLog}[2, c x^n]}{2 n}+\frac{b e m \operatorname{PolyLog}[3,-c x^n]}{2 n^2}-\frac{b e m \operatorname{PolyLog}[3, c x^n]}{2 n^2}$$

Result (type 5, 114 leaves):

$$-\frac{b c e m x^n \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, 1\right\},\left\{\frac{3}{2}, \frac{3}{2}, \frac{3}{2}\right\}, c^2 x^{2 n}\right]}{n^2}+\frac{b c x^n \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{2}, \frac{1}{2}, 1\right\},\left\{\frac{3}{2}, \frac{3}{2}\right\}, c^2 x^{2 n}\right](d+e \operatorname{Log}[f x^m])}{n}+\frac{1}{2} a \operatorname{Log}[x]\left(2 d-e m \operatorname{Log}[x]+2 e \operatorname{Log}\left[f x^m\right]\right)$$

Summary of Integration Test Results

2631 integration problems



A - 2198 optimal antiderivatives

B - 52 more than twice size of optimal antiderivatives

C - 219 unnecessarily complex antiderivatives

D - 147 unable to integrate problems

E - 15 integration timeouts