Mathematica 11.3 Integration Test Results

on the problems in the test-suite directory "5 Inverse trig functions\5.3 Inverse tangent"

Test results for the 166 problems in "5.3.2 (d x)^m (a+b arctan(c x^n))^p.m"

Problem 81: Unable to integrate problem.

$$\int x^2 \left(a + b \operatorname{ArcTan}\left[c x^2\right]\right)^2 dx$$

Optimal (type 4, 1393 leaves, 86 steps) :

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 8, 18 leaves):

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

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

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

Optimal (type 4, 1191 leaves, 69 steps) :

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

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

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

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

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

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

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

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

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

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

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

Result (type 4, 5620 leaves):

$$a^2 x + \frac{1}{c x} a b \sqrt{c x^2}$$

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

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

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

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

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

$$\left(\sqrt{c\,x^2}\left(1+\left(1-\sqrt{2}\,\sqrt{c\,x^2}\right)^2\right)^{3/2}\left(2\left(-5\,\text{ArcTan}[2+i]\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]+4\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]^2+(1+2\,i)\sqrt{1+i}\right.\right.\right.$$

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

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

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

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

$$\left.5\,\text{PolyLog}\left[2,e^{2\,i\left(-\text{ArcTan}[2+i]+\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\right)}\right]-5\,\text{PolyLog}\left[2,e^{2\,i\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2\,i]}\right]\right)\left(3+\right.$$

$$\left.\left.2\,\text{Cos}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\right]-2\,\text{Sin}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\right)\right)\Big/$$

$$\left(20\sqrt{2}\left(-1-c\,x^2+\sqrt{2}\sqrt{c\,x^2}\right)\left(1+c\,x^2+\sqrt{2}\sqrt{c\,x^2}\right)\left(\frac{1}{\sqrt{1+\left(1-\sqrt{2}\sqrt{c\,x^2}\right)^2}}-\frac{1-\sqrt{2}\sqrt{c\,x^2}}{\sqrt{1+\left(1-\sqrt{2}\sqrt{c\,x^2}\right)^2}}\right)\right)+$$

$$\frac{1}{1+c\,x^2+\sqrt{2}\sqrt{c\,x^2}}\left(\frac{1}{20}+\frac{\mathrm{i}}{20}\right)\mathrm{e}^{-\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]-\text{ArcTanh}[1+2\,\mathrm{i}]}\left(-1-c\,x^2+\sqrt{2}\sqrt{c\,x^2}\right)\Bigg((5+5\,\mathrm{i})\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\pi$$

$$\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]+10\,\mathrm{i}\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\text{ArcTan}[2+\mathrm{i}]\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]+(2-4\,\mathrm{i})\sqrt{1-\mathrm{i}}\;\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]}$$

$$\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]^2+(4-2\,\mathrm{i})\sqrt{1+\mathrm{i}}\;\mathrm{e}^{\text{ArcTanh}[1+2\,\mathrm{i}]}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]^2-(8-8\,\mathrm{i})\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\text{ArcTan}\Big[$$

$$1-\sqrt{2}\sqrt{c\,x^2}\Big]^2-10\,\mathrm{i}\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]\text{ArcTanh}[1+2\,\mathrm{i}]+(5-5\,\mathrm{i})\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\pi$$

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

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

$$\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]\text{Log}\left[1-\mathrm{e}^{2\,\mathrm{i}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2\,\mathrm{i}]}\right]+10\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\text{ArcTanh}[1+2\,\mathrm{i}]$$

$$\text{Log}\left[1-\mathrm{e}^{2\,\mathrm{i}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2\,\mathrm{i}]}\right]-(5-5\,\mathrm{i})\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\pi\,\text{Log}\left[\frac{1}{\sqrt{1+\left(1-\sqrt{2}\sqrt{c\,x^2}\right)^2}}\right]+10$$

$$\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\text{ArcTan}[2+\mathrm{i}]\,\text{Log}\left[-\text{Sin}\left[\text{ArcTan}[2+\mathrm{i}]-\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]\right]\right]-10$$

$$\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\text{ArcTanh}[1+2\,\mathrm{i}]\,\text{Log}\left[\text{Sin}\left[\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]+\mathrm{i}\,\text{ArcTanh}[1+2\,\mathrm{i}]\right]\right]-5$$

$$\mathrm{i}\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\text{PolyLog}\left[2,\mathrm{e}^{2\,\mathrm{i}\left(-\text{ArcTan}[2+\mathrm{i}]+\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]\right)}\right]-5\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}$$

$$\text{PolyLog}\left[2,\mathrm{e}^{2\,\mathrm{i}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2\,\mathrm{i}]}\right]\Bigg)\left(3+2\,\text{Cos}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]\right]-2\,\text{Sin}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]\right]\right)+$$

$$\left(\frac{1}{40}+\frac{\mathrm{i}}{40}\right)c\,\mathrm{e}^{-\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]-\text{ArcTanh}[1+2\,\mathrm{i}]}\,x^2\left(1+\left(1-\sqrt{2}\sqrt{c\,x^2}\right)^2\right)\Bigg((5+5\,\mathrm{i})\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[2+\mathrm{i}]+\text{ArcTanh}[1+2\,\mathrm{i}]}\,\pi\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c\,x^2}\right]+$$

$$10\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}\,\mathrm{ArcTan}[2+i]\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]+(4+2i)\,\sqrt{1-i}\,e^{i\,\mathrm{ArcTan}[2+i]}\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]^2-$$

$$(2+4i)\,\sqrt{1+i}\,e^{\mathrm{ArcTanh}[1+2i]}\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]^2+(4-4i)\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]^2+$$

$$10\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\mathrm{ArcTanh}[1+2i]+(5-5i)\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}\,\pi$$

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

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

$$10\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\mathrm{Log}\left[1-e^{2i\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\mathrm{ArcTanh}[1+2i]}\right]+10\,i\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}$$

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

$$10\,i\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}\,\mathrm{ArcTan}[2+i]\,\mathrm{Log}\left[-\mathrm{Sin}\left[\mathrm{ArcTan}[2+i]-\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\right]-$$

$$10\,i\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}\,\mathrm{ArcTanh}[1+2i]\,\mathrm{Log}\left[\mathrm{Sin}\left[\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]+i\,\mathrm{ArcTanh}[1+2i]\right]\right]-$$

$$5\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}\,\mathrm{PolyLog}\left[2,e^{2i\left(-\mathrm{ArcTan}[2+i]+\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\right)}\right]-5\,i\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2i]}$$

$$\left.\left.\mathrm{PolyLog}\left[2,e^{2i\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\mathrm{ArcTanh}[1+2i]}\right]\right)\left(3+2\,\mathrm{Cos}\left[2\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\right]-2\,\mathrm{Sin}\left[2\,\mathrm{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\right)\right)\Big/$$

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

$$\left(\sqrt{c\,x^2}\,\left(1+\left(1+\sqrt{2}\,\sqrt{c\,x^2}\right)^2\right)^{3/2}\right.\left(2\left(-5\,\mathrm{ArcTan}[2+i]\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+4\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2+(1+2i)\,\sqrt{1+i}\right.\right.$$

$$e^{-i\,\mathrm{ArcTan}[2+i]}\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2+(1-2i)\,\sqrt{1-i}\,e^{-\mathrm{ArcTanh}[1+2i]}\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2-5\,i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]$$

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

$$5\left(-i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+\mathrm{ArcTanh}[1+2i]\right)\mathrm{Log}\left[1-e^{2i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\mathrm{ArcTanh}[1+2i]}\right]+5\,i\,\mathrm{ArcTan}[2+i]\,\mathrm{Log}\Big[-\mathrm{Sin}\Big[$$

$$\left.\mathrm{ArcTan}[2+i]-\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\Big]\Big]-5\,\mathrm{ArcTanh}[1+2i]\,\mathrm{Log}\left[\mathrm{Sin}\left[\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+i\,\mathrm{ArcTanh}[1+2i]\right]\right]\right)+$$

$$5\,\text{PolyLog}\left[2, e^{2 i \left(-\text{ArcTan}[2+i]+\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right)}\right] - 5\,\text{PolyLog}\left[2, e^{2 i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2 i]}\right]\Big)\Big(3+$$

$$2\,\text{Cos}\left[2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right] - 2\,\text{Sin}\left[2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\Big)\Big)\Big/$$

$$\left(20\sqrt{2}\left(-1-c\,x^2+\sqrt{2}\,\sqrt{c\,x^2}\right)\left(1+c\,x^2+\sqrt{2}\,\sqrt{c\,x^2}\right)\left(\frac{1}{\sqrt{1+\left(1+\sqrt{2}\,\sqrt{c\,x^2}\right)^2}} - \frac{1+\sqrt{2}\,\sqrt{c\,x^2}}{\sqrt{1+\left(1+\sqrt{2}\,\sqrt{c\,x^2}\right)^2}}\right)\right) -$$

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

$$\Big((5+5 i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\pi\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right] + 10\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTan}[2+i]$$

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

$$\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2 - (8-8 i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2 - 10\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}$$

$$\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\text{ArcTanh}[1+2 i] + (5-5 i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\pi\,\text{Log}\left[1+e^{-2 i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]}\right] - 10$$

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

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

$$\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\text{Log}\left[1-e^{2 i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2 i]}\right] + 10\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTanh}[1+2 i]$$

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

$$e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTan}[2+i]\,\text{Log}\left[-\text{Sin}\left[\text{ArcTan}[2+i]-\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\right] - 10$$

$$e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTanh}[1+2 i]\,\text{Log}\left[\text{Sin}\left[\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+i\,\text{ArcTanh}[1+2 i]\right]\right] - 5$$

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

$$\left.\text{PolyLog}\left[2, e^{2\,i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2\,i]}\right]\right)\left(3+2\,\text{Cos}\left[2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]-2\,\text{Sin}\left[2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\right)-$$

$$\left(\left(\frac{1}{40}+\frac{i}{40}\right) c\, e^{-i\,\text{ArcTan}[2+i]-\text{ArcTanh}[1+2\,i]}\, x^2 \left(1+\left(1+\sqrt{2}\,\sqrt{c\,x^2}\right)^2\right)\left((5+5\,i)\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\pi\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+\right.\right.$$

$$10\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}[2+i]\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+(4+2\,i)\,\sqrt{1-i}\; e^{i\,\text{ArcTan}[2+i]}\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2-$$

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

$$10\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\text{ArcTanh}[1+2\,i]+(5-5\,i)\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\pi$$

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

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

$$10\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\text{Log}\left[1-e^{2\,i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2\,i]}\right]+10\,i\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}$$

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

$$10\,i\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}[2+i]\,\text{Log}\left[-\text{Sin}\left[\text{ArcTan}[2+i]-\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\right]-$$

$$10\,i\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTanh}[1+2\,i]\,\text{Log}\left[\text{Sin}\left[\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+i\,\text{ArcTanh}[1+2\,i]\right]\right]-$$

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

$$\left.\left.\text{PolyLog}\left[2, e^{2\,i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2\,i]}\right]\right)\left(3+2\,\text{Cos}\left[2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]-2\,\text{Sin}\left[2\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\right)\right)\Big/$$

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

Problem 83: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 1164 leaves, 47 steps):

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

Result (type 1, 1 leaves):

???

Problem 84: Unable to integrate problem.

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

Optimal (type 4, 1360 leaves, 64 steps) :

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

Result (type 8, 18 leaves) :

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

Problem 85: Unable to integrate problem.

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

Optimal (type 4, 1444 leaves, 77 steps) :

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

Result (type 8, 18 leaves):

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

Problem 166: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 34 leaves):

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

Test results for the 31 problems in "5.3.3 (d+e x)^m (a+b arctan(c x^n))^p.m"

Problem 6: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 98 leaves, 6 steps):

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

Result (type 3, 115 leaves):

$$-\Big(\big(2\,a\,c^2\,d^2+2\,a\,e^2+2\,b\,e\,(e-c^2\,d\,x)\,\text{ArcTan}[c\,x]-2\,b\,c\,e\,(d+e\,x)\,\text{Log}[d+e\,x]+b\,c\,d\,e\,\text{Log}[1+c^2\,x^2]+b\,c\,e^2\,x\,\text{Log}[1+c^2\,x^2]\big)\Big/\\ \big(2\,e\,(-i\,c\,d+e)\,(i\,c\,d+e)\,(d+e\,x)\big)\Big)$$

Problem 7: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 146 leaves, 7 steps):

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

Result (type 3, 177 leaves):

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

Problem 8: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 206 leaves, 7 steps):

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

Result (type 3, 211 leaves):

$$\frac{1}{12} \left(-\frac{4 a}{e (d+e x)^3}-\frac{2 b c}{\left(c^2 d^2+e^2\right) (d+e x)^2}-\frac{8 b c^3 d}{\left(c^2 d^2+e^2\right)^2 (d+e x)}+\frac{2 b \left(c^3 \left(\frac{1}{(c d-i e)^3}+\frac{1}{(c d+i e)^3}\right)-\frac{2}{(d+e x)^3}\right) \text{ArcTan}[c x]}{e}+\frac{4 b c^3 \left(3 c^2 d^2-e^2\right) \text{Log}[d+e x]}{\left(c^2 d^2+e^2\right)^3}+\frac{b c^3 \text{Log}\left[1+c^2 x^2\right]}{e (-i c d+e)^3}+\frac{b c^3 \text{Log}\left[1+c^2 x^2\right]}{e (i c d+e)^3}\right)$$

Problem 12: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 223 leaves, 1 step):

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

Result (type 1, 1 leaves):

???

Problem 18: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 320 leaves, 1 step):

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

Result (type 1, 1 leaves):

???

Problem 19: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 499 leaves, 10 steps):

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

Result (type 1, 1 leaves) :

???

Problem 20: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 936 leaves, 23 steps) :

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

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

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

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

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

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

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

Result (type 1, 1 leaves):

???

Problem 23: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 501 leaves, 19 steps):

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

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

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

Result (type 1, 1 leaves) :

???

Problem 25: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 1325 leaves, 77 steps) :

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 4, 5745 leaves) :

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

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

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

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

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

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

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

$$\left(\sqrt{c x^2} \left(1 + \left(1 - \sqrt{2} \sqrt{c x^2}\right)^2\right)^{3/2} \left(2 \left(-5 \text{ArcTan}[2 + i]\, \text{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] + 4 \text{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right]^2 + (1 + 2 i) \sqrt{1 + i}\right.\right.\right.$$

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

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

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

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

$$\left.5 \text{PolyLog}\left[2, e^{2 i \left(-\text{ArcTan}[2+i] + \text{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right]\right)}\right] - 5 \text{PolyLog}\left[2, e^{2 i \text{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] - 2 \text{ArcTanh}[1+2 i]}\right]\right) \left(3 +\right.$$

$$2\,\text{Cos}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\right]-2\,\text{Sin}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\right]\Big)\Big)\Big/$$

$$\left(20\,\sqrt{2}\,\left(-1-c\,x^2+\sqrt{2}\,\sqrt{c\,x^2}\right)\left(1+c\,x^2+\sqrt{2}\,\sqrt{c\,x^2}\right)\left(\frac{1}{\sqrt{1+\left(1-\sqrt{2}\,\sqrt{c\,x^2}\right)^2}}-\frac{1-\sqrt{2}\,\sqrt{c\,x^2}}{\sqrt{1+\left(1-\sqrt{2}\,\sqrt{c\,x^2}\right)^2}}\right)\right)+$$

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

$$\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]+10\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}[2+i]\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]+(2-4\,i)\,\sqrt{1-i}\,e^{i\,\text{ArcTan}[2+i]}$$
$$\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]^2+(4-2\,i)\,\sqrt{1+i}\,e^{\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]^2-(8-8\,i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}\Big[$$
$$1-\sqrt{2}\,\sqrt{c\,x^2}\,\Big]^2-10\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\text{ArcTanh}[1+2\,i]+(5-5\,i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\pi$$
$$\text{Log}\left[1+e^{-2\,i\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]}\right]-10\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}[2+i]\,\text{Log}\left[1-e^{2\,i\,\left(-\text{ArcTan}[2+i]+\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\right)}\right]+10$$
$$e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\text{Log}\left[1-e^{2\,i\,\left(-\text{ArcTan}[2+i]+\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\right)}\right]-10\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}$$
$$\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\text{Log}\left[1-e^{2\,i\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]-2\,\text{ArcTanh}[1+2\,i]}\right]+10\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTanh}[1+2\,i]$$
$$\text{Log}\left[1-e^{2\,i\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]-2\,\text{ArcTanh}[1+2\,i]}\right]-(5-5\,i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\pi\,\text{Log}\left[\frac{1}{\sqrt{1+\left(1-\sqrt{2}\,\sqrt{c\,x^2}\right)^2}}\right]+10$$
$$e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTan}[2+i]\,\text{Log}\left[-\text{Sin}\left[\text{ArcTan}[2+i]-\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\right]\right]-10$$
$$e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{ArcTanh}[1+2\,i]\,\text{Log}\left[\text{Sin}\left[\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]+i\,\text{ArcTanh}[1+2\,i]\right]\right]-5$$
$$i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}\,\text{PolyLog}\left[2,\,e^{2\,i\,\left(-\text{ArcTan}[2+i]+\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\right)}\right]-5\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2\,i]}$$
$$\text{PolyLog}\left[2,\,e^{2\,i\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]-2\,\text{ArcTanh}[1+2\,i]}\right]\Bigg)\left(3+2\,\text{Cos}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\right]-2\,\text{Sin}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\,\sqrt{c\,x^2}\,\right]\right]\right)+$$

$$\left(\left(\frac{1}{40}+\frac{i}{40}\right) c\, e^{-i\,\text{ArcTan}[2+i]-\text{ArcTanh}[1+2 i]} x^2 \left(1+\left(1-\sqrt{2}\sqrt{c x^2}\right)^2\right)\left((5+5 i)\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]} \pi\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]+\right.\right.$$

$$10\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTan}[2+i]\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]+(4+2 i)\sqrt{1-i}\, e^{i\,\text{ArcTan}[2+i]}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]^2-$$

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

$$10\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]\text{ArcTanh}[1+2 i]+(5-5 i)\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\pi$$

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

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

$$10\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]\text{Log}\left[1-e^{2 i\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]-2\,\text{ArcTanh}[1+2 i]}\right]+10 i\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}$$

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

$$10 i\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTan}[2+i]\,\text{Log}\left[-\text{Sin}\left[\text{ArcTan}[2+i]-\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]\right]\right]-$$

$$10 i\, e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2 i]}\,\text{ArcTanh}[1+2 i]\,\text{Log}\left[\text{Sin}\left[\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]+i\,\text{ArcTanh}[1+2 i]\right]\right]-$$

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

$$\left.\left.\text{PolyLog}\left[2, e^{2 i\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]-2\,\text{ArcTanh}[1+2 i]}\right]\right)\left(3+2\,\text{Cos}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]\right]-2\,\text{Sin}\left[2\,\text{ArcTan}\left[1-\sqrt{2}\sqrt{c x^2}\right]\right]\right)\right)\Bigg/$$

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

$$\left(\sqrt{c x^2}\left(1+\left(1+\sqrt{2}\sqrt{c x^2}\right)^2\right)^{3/2}\left(2\left(-5\,\text{ArcTan}[2+i]\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{c x^2}\right]+4\,\text{ArcTan}\left[1+\sqrt{2}\sqrt{c x^2}\right]^2+(1+2 i)\sqrt{1+i}\right.\right.\right.$$

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

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

$$5\left(-i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+\mathrm{ArcTanh}[1+2\,i]\right)\mathrm{Log}\left[1-e^{2\,i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\mathrm{ArcTanh}[1+2\,i]}\right]+5\,i\,\mathrm{ArcTan}[2+i]\,\mathrm{Log}\Big[-\mathrm{Sin}\Big[$$

$$\mathrm{ArcTan}[2+i]-\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\Big]\Big]-5\,\mathrm{ArcTanh}[1+2\,i]\,\mathrm{Log}\left[\mathrm{Sin}\left[\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+i\,\mathrm{ArcTanh}[1+2\,i]\right]\right]\Big)+$$

$$5\,\mathrm{PolyLog}\left[2,e^{2\,i\left(-\mathrm{ArcTan}[2+i]+\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right)}\right]-5\,\mathrm{PolyLog}\left[2,e^{2\,i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\mathrm{ArcTanh}[1+2\,i]}\right]\Big)\Big(3+$$

$$2\,\mathrm{Cos}\left[2\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]-2\,\mathrm{Sin}\left[2\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\Big)\Big)\Big/$$

$$\left(20\sqrt{2}\left(-1-c\,x^2+\sqrt{2}\,\sqrt{c\,x^2}\right)\left(1+c\,x^2+\sqrt{2}\,\sqrt{c\,x^2}\right)\left(\frac{1}{\sqrt{1+\left(1+\sqrt{2}\,\sqrt{c\,x^2}\right)^2}}-\frac{1+\sqrt{2}\,\sqrt{c\,x^2}}{\sqrt{1+\left(1+\sqrt{2}\,\sqrt{c\,x^2}\right)^2}}\right)\right)-$$

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

$$\Big((5+5\,i)\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2\,i]}\,\pi\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+10\,i\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2\,i]}\,\mathrm{ArcTan}[2+i]$$

$$\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]+(2-4\,i)\sqrt{1-i}\;e^{i\,\mathrm{ArcTan}[2+i]}\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2+(4-2\,i)\sqrt{1+i}\;e^{\mathrm{ArcTanh}[1+2\,i]}$$

$$\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2-(8-8\,i)\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2\,i]}\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]^2-10\,i\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2\,i]}$$

$$\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\mathrm{ArcTanh}[1+2\,i]+(5-5\,i)\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2\,i]}\,\pi\,\mathrm{Log}\left[1+e^{-2\,i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]}\right]-10$$

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

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

$$\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\mathrm{Log}\left[1-e^{2\,i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\mathrm{ArcTanh}[1+2\,i]}\right]+10\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2\,i]}\,\mathrm{ArcTanh}[1+2\,i]$$

$$\mathrm{Log}\left[1-e^{2\,i\,\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\mathrm{ArcTanh}[1+2\,i]}\right]-(5-5\,i)\,e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2\,i]}\,\pi\,\mathrm{Log}\left[\frac{1}{\sqrt{1+\left(1+\sqrt{2}\,\sqrt{c\,x^2}\right)^2}}\right]+10$$

$$e^{i\,\mathrm{ArcTan}[2+i]+\mathrm{ArcTanh}[1+2\,i]}\,\mathrm{ArcTan}[2+i]\,\mathrm{Log}\left[-\mathrm{Sin}\left[\mathrm{ArcTan}[2+i]-\mathrm{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right]\right]-10$$

$$e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{ArcTanh}[1+2i]\,\text{Log}\Big[\text{Sin}\Big[\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]+i\,\text{ArcTanh}[1+2i]\Big]\Big]-5$$

$$i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{PolyLog}\Big[2,\,e^{2i\left(-\text{ArcTan}[2+i]+\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right)}\Big]-5\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}$$

$$\left.\text{PolyLog}\Big[2,\,e^{2i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2i]}\Big]\right)\Big/\left(3+2\,\text{Cos}\Big[2\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]\Big]-2\,\text{Sin}\Big[2\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]\Big]\right)-$$

$$\left(\left(\frac{1}{40}+\frac{i}{40}\right)c\,e^{-i\,\text{ArcTan}[2+i]-\text{ArcTanh}[1+2i]}\,x^2\left(1+\left(1+\sqrt{2}\,\sqrt{c\,x^2}\right)^2\right)\left((5+5i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\pi\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]+\right.\right.$$

$$10\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{ArcTan}[2+i]\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]+(4+2i)\,\sqrt{1-i}\,e^{i\,\text{ArcTan}[2+i]}\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]^2-$$

$$(2+4i)\,\sqrt{1+i}\,e^{\text{ArcTanh}[1+2i]}\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]^2+(4-4i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]^2+$$

$$10\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]\,\text{ArcTanh}[1+2i]+(5-5i)\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\pi$$

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

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

$$10\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]\,\text{Log}\Big[1-e^{2i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2i]}\Big]+10\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}$$

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

$$10\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{ArcTan}[2+i]\,\text{Log}\Big[-\text{Sin}\Big[\text{ArcTan}[2+i]-\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]\Big]\Big]-$$

$$10\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{ArcTanh}[1+2i]\,\text{Log}\Big[\text{Sin}\Big[\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]+i\,\text{ArcTanh}[1+2i]\Big]\Big]-$$

$$5\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}\,\text{PolyLog}\Big[2,\,e^{2i\left(-\text{ArcTan}[2+i]+\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]\right)}\Big]-5\,i\,e^{i\,\text{ArcTan}[2+i]+\text{ArcTanh}[1+2i]}$$

$$\left.\left.\text{PolyLog}\Big[2,\,e^{2i\,\text{ArcTan}\left[1+\sqrt{2}\,\sqrt{c\,x^2}\right]-2\,\text{ArcTanh}[1+2i]}\Big]\right)\Big/\left(3+2\,\text{Cos}\Big[2\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]\Big]-2\,\text{Sin}\Big[2\,\text{ArcTan}\Big[1+\sqrt{2}\,\sqrt{c\,x^2}\Big]\Big]\right)\right)\Big/$$

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

Problem 26: Attempted integration timed out after 120 seconds.

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

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

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

Result (type 1, 1 leaves):

???

Problem 28: Attempted integration timed out after 120 seconds.

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

Optimal (type 3, 315 leaves, 24 steps):

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

Result (type 1, 1 leaves):

???

Problem 30: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 739 leaves, 25 steps):

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

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

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

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

Result (type 1, 1 leaves):

???

Test results for the 1301 problems in "5.3.4 u (a+b arctan(c x))^p.m"

Problem 130: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 128 leaves, 4 steps):

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

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

Result (type 4, 268 leaves):

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

Problem 141: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 598 leaves, 23 steps):

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

Result (type 1, 1 leaves):

???

Problem 142: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 430 leaves, 14 steps):

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

Result (type 1, 1 leaves):

???

Problem 143: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 323 leaves, 8 steps):

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

Result (type 1, 1 leaves):

???

Problem 144: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 223 leaves, 1 step):

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

Result (type 1, 1 leaves):

???

Problem 145: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 369 leaves, 9 steps):

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

Result (type 1, 1 leaves):

???

Problem 146: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 473 leaves, 13 steps):

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

Result (type 1, 1 leaves):

???

Problem 147: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 591 leaves, 21 steps):

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

Result (type 1, 1 leaves):

???

Problem 217: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 418 leaves, 51 steps):

$$\frac{5 c^2 \sqrt{c+a^2 c x^2}}{128 a^3}+\frac{5 c \left(c+a^2 c x^2\right)^{3/2}}{576 a^3}+\frac{\left(c+a^2 c x^2\right)^{5/2}}{240 a^3}-\frac{\left(c+a^2 c x^2\right)^{7/2}}{56 a^3 c}+\frac{5 c^2 x \sqrt{c+a^2 c x^2} \text{ ArcTan}[a x]}{128 a^2}+$$
$$\frac{59}{192} c^2 x^3 \sqrt{c+a^2 c x^2} \text{ ArcTan}[a x]+\frac{17}{48} a^2 c^2 x^5 \sqrt{c+a^2 c x^2} \text{ ArcTan}[a x]+\frac{1}{8} a^4 c^2 x^7 \sqrt{c+a^2 c x^2} \text{ ArcTan}[a x]+$$
$$\frac{5 i c^3 \sqrt{1+a^2 x^2} \text{ ArcTan}[a x] \text{ ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{64 a^3 \sqrt{c+a^2 c x^2}}-\frac{5 i c^3 \sqrt{1+a^2 x^2} \text{ PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{128 a^3 \sqrt{c+a^2 c x^2}}+\frac{5 i c^3 \sqrt{1+a^2 x^2} \text{ PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{128 a^3 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1780 leaves):

$$\frac{1}{a^3} c^2 \left(\frac{89 \sqrt{c \left(1+a^2 x^2\right)}}{10080 \sqrt{1+a^2 x^2}}-\frac{1}{128 \sqrt{1+a^2 x^2}} 5 \sqrt{c \left(1+a^2 x^2\right)}\right.$$
$$\left(\text{ArcTan}[a x] \left(\text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-\text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]\right)+i \left(\text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]\right)\right)+$$
$$\frac{\sqrt{c \left(1+a^2 x^2\right)} \text{ ArcTan}[a x]}{128 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^8}+\frac{\sqrt{c \left(1+a^2 x^2\right)} \left(-3-98 \text{ ArcTan}[a x]\right)}{2688 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^6}+$$
$$\frac{\sqrt{c \left(1+a^2 x^2\right)} \left(178+1575 \text{ ArcTan}[a x]\right)}{26880 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^4}+\frac{\sqrt{c \left(1+a^2 x^2\right)} \left(-1219-1575 \text{ ArcTan}[a x]\right)}{80640 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^2}-$$
$$\frac{\sqrt{c \left(1+a^2 x^2\right)} \text{ Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{448 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^7}+\frac{89 \sqrt{c \left(1+a^2 x^2\right)} \text{ Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{6720 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^5}-$$
$$\frac{1219 \sqrt{c \left(1+a^2 x^2\right)} \text{ Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{40320 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^3}+\frac{89 \sqrt{c \left(1+a^2 x^2\right)} \text{ Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{10080 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)}-$$
$$\frac{\sqrt{c \left(1+a^2 x^2\right)} \text{ ArcTan}[a x]}{128 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^8}+\frac{\sqrt{c \left(1+a^2 x^2\right)} \text{ Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{448 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^7}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,(-3+98\,\text{ArcTan}[a\,x])}{2688\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}-\frac{89\sqrt{c\,(1+a^2x^2)}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{6720\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,(178-1575\,\text{ArcTan}[a\,x])}{26880\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+\frac{1219\sqrt{c\,(1+a^2x^2)}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40320\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\left.\frac{\sqrt{c\,(1+a^2x^2)}\,(-1219+1575\,\text{ArcTan}[a\,x])}{80640\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-\frac{89\sqrt{c\,(1+a^2x^2)}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{10080\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)+$$

$$\frac{1}{48\,a^3\sqrt{1+a^2x^2}}\,c^2\sqrt{c\,(1+a^2x^2)}\,\Bigg(-6\,i\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+6\,i\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$$

$$\frac{1}{4}\left(1+a^2x^2\right)^2\Bigg(-\frac{2}{\sqrt{1+a^2x^2}}-6\,\text{Cos}[3\,\text{ArcTan}[a\,x]]+$$

$$3\,\text{ArcTan}[a\,x]\Bigg(-\frac{14\,a\,x}{\sqrt{1+a^2x^2}}+3\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+4\,\text{Cos}[2\,\text{ArcTan}[a\,x]]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)+$$

$$\text{Cos}[4\,\text{ArcTan}[a\,x]]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)-3\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]+2\,\text{Sin}[3\,\text{ArcTan}[a\,x]]\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{720\,a^3\sqrt{1+a^2x^2}}\,c^2\sqrt{c\,(1+a^2x^2)}\,\Bigg(90\,i\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-90\,i\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$

$$\frac{1}{16}\left(1+a^2x^2\right)^3\Bigg(\frac{12}{\sqrt{1+a^2x^2}}+110\,\text{Cos}[3\,\text{ArcTan}[a\,x]]-90\,\text{Cos}[5\,\text{ArcTan}[a\,x]]+$$

$$15\,\text{ArcTan}[a\,x]\Bigg(\frac{156\,a\,x}{\sqrt{1+a^2x^2}}+30\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+3\,\text{Cos}[6\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+45\,\text{Cos}[2\,\text{ArcTan}[a\,x]]$$

$$\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)+18\,\text{Cos}[4\,\text{ArcTan}[a\,x]]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)-$$

$$30\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-3\,\text{Cos}[6\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-94\,\text{Sin}[3\,\text{ArcTan}[a\,x]]+6\,\text{Sin}[5\,\text{ArcTan}[a\,x]]\Bigg)\Bigg)\Bigg)$$

Problem 316: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 531 leaves, 92 steps):

$$\frac{c x \sqrt{c+a^2 c x^2}}{36 a^2}+\frac{1}{60} c x^3 \sqrt{c+a^2 c x^2}+\frac{31 c \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]}{360 a^3}-\frac{19 c x^2 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]}{180 a}-\frac{1}{15} a c x^4 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]+\frac{c x \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2}{16 a^2}+\frac{7}{24} c x^3 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2+\frac{1}{6} a^2 c x^5 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2+\frac{i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^2}{8 a^3 \sqrt{c+a^2 c x^2}}-\frac{41 c^{3/2} \text{ArcTanh}\left[\frac{a \sqrt{c}\, x}{\sqrt{c+a^2 c x^2}}\right]}{360 a^3}-\frac{i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}+\frac{i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] \text{PolyLog}\left[2, i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}+\frac{c^2 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}-\frac{c^2 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[3, i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1115 leaves):

$$\frac{1}{11520 a^3 \sqrt{1+a^2 x^2}} c \sqrt{c+a^2 c x^2} \Bigg(184 a x \sqrt{1+a^2 x^2}+128 a^3 x^3 \sqrt{1+a^2 x^2}-56 a^5 x^5 \sqrt{1+a^2 x^2}+252 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]+264 a^2 x^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]+12 a^4 x^4 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]+3690 a x \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2+4860 a^3 x^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2+1170 a^5 x^5 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2+830 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]]+1770 a^2 x^2 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]]+1050 a^4 x^4 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]]+110 a^6 x^6 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]]-90 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]]-270 a^2 x^2 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]]-270 a^4 x^4 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]]-90 a^6 x^6 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]]-720 \pi \text{ArcTan}[a x] \text{Log}[2]+480 \pi \text{ArcTan}[a x] \text{Log}[8]-720 \text{ArcTan}[a x]^2 \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+720 \text{ArcTan}[a x]^2 \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-720 \pi \text{ArcTan}[a x] \text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right) e^{-\frac{1}{2} i \text{ArcTan}[a x]} \left(-i+e^{i \text{ArcTan}[a x]}\right)\right]+720 \text{ArcTan}[a x]^2 \text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right) e^{-\frac{1}{2} i \text{ArcTan}[a x]} \left(-i+e^{i \text{ArcTan}[a x]}\right)\right]-720 \pi \text{ArcTan}[a x] \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \text{ArcTan}[a x]} \left((1+i)+(1-i) e^{i \text{ArcTan}[a x]}\right)\right]-720 \text{ArcTan}[a x]^2 \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \text{ArcTan}[a x]} \left((1+i)+(1-i) e^{i \text{ArcTan}[a x]}\right)\right]+720 \pi \text{ArcTan}[a x] \text{Log}\left[-\text{Cos}\left[\frac{1}{4} (\pi+2 \text{ArcTan}[a x])\right]\right]+1312 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]-720 \text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]-1312 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]+720 \text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]+720 \pi \text{ArcTan}[a x] \text{Log}\left[\text{Sin}\left[\frac{1}{4} (\pi+2 \text{ArcTan}[a x])\right]\right]-1440 i \text{ArcTan}[a x] \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]+1440 i \text{ArcTan}[a x] \text{PolyLog}\left[2, i e^{i \text{ArcTan}[a x]}\right]+1440 \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]-1440 \text{PolyLog}\left[3, i e^{i \text{ArcTan}[a x]}\right]+132 \text{Sin}[3 \text{ArcTan}[a x]]+156 a^2 x^2 \text{Sin}[3 \text{ArcTan}[a x]]-84 a^4 x^4 \text{Sin}[3 \text{ArcTan}[a x]]-108 a^6 x^6 \text{Sin}[3 \text{ArcTan}[a x]]-1065 \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]]-2835 a^2 x^2 \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]]-2475 a^4 x^4 \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]]-705 a^6 x^6 \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]]-52 \text{Sin}[5 \text{ArcTan}[a x]]-156 a^2 x^2 \text{Sin}[5 \text{ArcTan}[a x]]-156 a^4 x^4 \text{Sin}[5 \text{ArcTan}[a x]]-52 a^6 x^6 \text{Sin}[5 \text{ArcTan}[a x]]+45 \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]]+135 a^2 x^2 \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]]+135 a^4 x^4 \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]]+45 a^6 x^6 \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]]\Bigg)$$

Problem 323: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 578 leaves, 203 steps):

$$-\frac{115 c^2 \sqrt{c+a^2 c x^2}}{4032 a^4}-\frac{115 c \left(c+a^2 c x^2\right)^{3/2}}{18144 a^4}-\frac{23 \left(c+a^2 c x^2\right)^{5/2}}{7560 a^4}+\frac{\left(c+a^2 c x^2\right)^{7/2}}{252 a^4 c}+\frac{47 c^2 x \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]}{1344 a^3}-\frac{205 c^2 x^3 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]}{6048 a}-\frac{103 a c^2 x^5 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]}{1512}-\frac{1}{36} a^3 c^2 x^7 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]-\frac{2 c^2 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2}{63 a^4}+\frac{c^2 x^2 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2}{63 a^2}+\frac{5}{21} c^2 x^4 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2+\frac{19}{63} a^2 c^2 x^6 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2+\frac{1}{9} a^4 c^2 x^8 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2-\frac{115 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{2016 a^4 \sqrt{c+a^2 c x^2}}+\frac{115 i c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{4032 a^4 \sqrt{c+a^2 c x^2}}-\frac{115 i c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{4032 a^4 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1381 leaves):

$$-\frac{1}{960 a^4} c^2 \left(1+a^2 x^2\right)^2 \sqrt{c \left(1+a^2 x^2\right)} \left(50-32 \text{ArcTan}[a x]^2+72 \text{Cos}[2 \text{ArcTan}[a x]]+160 \text{ArcTan}[a x]^2 \text{Cos}[2 \text{ArcTan}[a x]]+22 \text{Cos}[4 \text{ArcTan}[a x]]-\frac{110 \text{ArcTan}[a x] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-55 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-11 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+\frac{110 \text{ArcTan}[a x] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+55 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]+11 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-\frac{176 i \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{5/2}}+\frac{176 i \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{5/2}}+4 \text{ArcTan}[a x] \text{Sin}[2 \text{ArcTan}[a x]]-22 \text{ArcTan}[a x] \text{Sin}[4 \text{ArcTan}[a x]]\right)+$$

$$\frac{1}{80640 a^4} c^2 \left(1+a^2 x^2\right)^3 \sqrt{c \left(1+a^2 x^2\right)} \left(4116+10944 \text{ArcTan}[a x]^2+6262 \text{Cos}[2 \text{ArcTan}[a x]]-5376 \text{ArcTan}[a x]^2 \text{Cos}[2 \text{ArcTan}[a x]]+2764 \text{Cos}[4 \text{ArcTan}[a x]]+6720 \text{ArcTan}[a x]^2 \text{Cos}[4 \text{ArcTan}[a x]]+618 \text{Cos}[6 \text{ArcTan}[a x]]-\frac{10815 \text{ArcTan}[a x] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-6489 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-2163 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-309 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+\frac{10815 \text{ArcTan}[a x] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\right.$$

$6489\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]+2163\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$

$309\,\text{ArcTan}[a\,x]\,\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\frac{19776\,i\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1+a^2\,x^2\right)^{7/2}}+\frac{19776\,i\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1+a^2\,x^2\right)^{7/2}}-$

$1266\,\text{ArcTan}[a\,x]\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+360\,\text{ArcTan}[a\,x]\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-618\,\text{ArcTan}[a\,x]\,\text{Sin}[6\,\text{ArcTan}[a\,x]]\Bigg)-$

$\frac{1}{46448640\,a^4}c^2\left(1+a^2\,x^2\right)^4\sqrt{c\left(1+a^2\,x^2\right)}\Bigg(657578-820224\,\text{ArcTan}[a\,x]^2+1083168\,\text{Cos}[2\,\text{ArcTan}[a\,x]]+$

$3276288\,\text{ArcTan}[a\,x]^2\,\text{Cos}[2\,\text{ArcTan}[a\,x]]+576936\,\text{Cos}[4\,\text{ArcTan}[a\,x]]-580608\,\text{ArcTan}[a\,x]^2\,\text{Cos}[4\,\text{ArcTan}[a\,x]]+$

$184160\,\text{Cos}[6\,\text{ArcTan}[a\,x]]+483840\,\text{ArcTan}[a\,x]^2\,\text{Cos}[6\,\text{ArcTan}[a\,x]]+32814\,\text{Cos}[8\,\text{ArcTan}[a\,x]]-$

$\frac{2067282\,\text{ArcTan}[a\,x]\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-1378188\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$

$590652\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-147663\,\text{ArcTan}[a\,x]\,\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$

$16407\,\text{ArcTan}[a\,x]\,\text{Cos}[9\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+\frac{2067282\,\text{ArcTan}[a\,x]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$

$1378188\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]+590652\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$

$147663\,\text{ArcTan}[a\,x]\,\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]+16407\,\text{ArcTan}[a\,x]\,\text{Cos}[9\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$

$\frac{4200192\,i\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1+a^2\,x^2\right)^{9/2}}+\frac{4200192\,i\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1+a^2\,x^2\right)^{9/2}}+78444\,\text{ArcTan}[a\,x]\,\text{Sin}[2\,\text{ArcTan}[a\,x]]-$

$160452\,\text{ArcTan}[a\,x]\,\text{Sin}[4\,\text{ArcTan}[a\,x]]+38172\,\text{ArcTan}[a\,x]\,\text{Sin}[6\,\text{ArcTan}[a\,x]]-32814\,\text{ArcTan}[a\,x]\,\text{Sin}[8\,\text{ArcTan}[a\,x]]\Bigg)$

Problem 324: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 638 leaves, 238 steps):

$$\frac{43\,c^2\,x\,\sqrt{c+a^2\,c\,x^2}}{4032\,a^2}+\frac{29\,c^2\,x^3\,\sqrt{c+a^2\,c\,x^2}}{1680}+\frac{1}{168}\,a^2\,c^2\,x^5\,\sqrt{c+a^2\,c\,x^2}+\frac{1373\,c^2\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]}{20\,160\,a^3}-\frac{737\,c^2\,x^2\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]}{10\,080\,a}-$$

$$\frac{83}{840}\,a\,c^2\,x^4\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]-\frac{1}{28}\,a^3\,c^2\,x^6\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]+\frac{5\,c^2\,x\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2}{128\,a^2}+$$

$$\frac{59}{192}\,c^2\,x^3\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2+\frac{17}{48}\,a^2\,c^2\,x^5\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2+\frac{1}{8}\,a^4\,c^2\,x^7\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2+$$

$$\frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\,\text{ArcTan}[a\,x]^2}{64\,a^3\,\sqrt{c+a^2\,c\,x^2}}-\frac{397\,c^{5/2}\,\text{ArcTanh}\left[\frac{a\,\sqrt{c}\,x}{\sqrt{c+a^2\,c\,x^2}}\right]}{5040\,a^3}-\frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{64\,a^3\,\sqrt{c+a^2\,c\,x^2}}+$$

$$\frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{64\,a^3\,\sqrt{c+a^2\,c\,x^2}}+\frac{5\,c^3\,\sqrt{1+a^2\,x^2}\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{64\,a^3\,\sqrt{c+a^2\,c\,x^2}}-\frac{5\,c^3\,\sqrt{1+a^2\,x^2}\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{64\,a^3\,\sqrt{c+a^2\,c\,x^2}}$$

Result (type 4, 1557 leaves) :

$$\frac{1}{2\,580\,480\, a^3 \sqrt{1+a^2 x^2}}$$

$$c^2 \sqrt{c+a^2 c x^2} \left(35\,678\, a x \sqrt{1+a^2 x^2} + 24\,602\, a^3 x^3 \sqrt{1+a^2 x^2} - 4070\, a^5 x^5 \sqrt{1+a^2 x^2} + 7006\, a^7 x^7 \sqrt{1+a^2 x^2} + 21\,002 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] -\right.$$

$$49\,890\, a^2 x^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] - 109\,026\, a^4 x^4 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] - 38\,134\, a^6 x^6 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] +$$

$$1\,273\,965\, a x \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 + 2\,168\,775\, a^3 x^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 + 1\,080\,135\, a^5 x^5 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 +$$

$$185\,325\, a^7 x^7 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 + 202\,902\, \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] + 439\,768\, a^2 x^2 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] +$$

$$263\,172\, a^4 x^4 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] + 18\,648\, a^6 x^6 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] -$$

$$7658\, a^8 x^8 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] - 51\,310\, \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] - 164\,920\, a^2 x^2 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] -$$

$$186\,900\, a^4 x^4 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] - 84\,280\, a^6 x^6 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] - 10\,990\, a^8 x^8 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] +$$

$$3150\, \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] + 12\,600\, a^2 x^2 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] + 18\,900\, a^4 x^4 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] +$$

$$12\,600\, a^6 x^6 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] + 3150\, a^8 x^8 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] - 221\,760\, \pi\, \text{ArcTan}[a x] \text{Log}[2] +$$

$$107\,520\, \pi\, \text{ArcTan}[a x] \text{Log}[8] - 100\,800\, \text{ArcTan}[a x]^2 \text{Log}\left[1 - i\, e^{i\, \text{ArcTan}[a x]}\right] + 100\,800\, \text{ArcTan}[a x]^2 \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a x]}\right] -$$

$$100\,800\, \pi\, \text{ArcTan}[a x] \text{Log}\left[\left(-\frac{1}{2} - \frac{i}{2}\right) e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left(-i + e^{i\, \text{ArcTan}[a x]}\right)\right] + 100\,800\, \text{ArcTan}[a x]^2 \text{Log}\left[\left(\frac{1}{2} + \frac{i}{2}\right) e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left(-i + e^{i\, \text{ArcTan}[a x]}\right)\right] -$$

$$100\,800\, \pi\, \text{ArcTan}[a x] \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left((1+i) + (1-i)\, e^{i\, \text{ArcTan}[a x]}\right)\right] -$$

$$100\,800\, \text{ArcTan}[a x]^2 \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left((1+i) + (1-i)\, e^{i\, \text{ArcTan}[a x]}\right)\right] + 100\,800\, \pi\, \text{ArcTan}[a x] \text{Log}\left[-\text{Cos}\left[\frac{1}{4} (\pi + 2\, \text{ArcTan}[a x])\right]\right] +$$

$$203\,264\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] - 100\,800\, \text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] -$$

$$203\,264\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] + 100\,800\, \text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] +$$

$$100\,800\, \pi\, \text{ArcTan}[a x] \text{Log}\left[\text{Sin}\left[\frac{1}{4} (\pi + 2\, \text{ArcTan}[a x])\right]\right] - 201\,600\, i\, \text{ArcTan}[a x] \text{PolyLog}\left[2, -i\, e^{i\, \text{ArcTan}[a x]}\right] +$$

$$201\,600\, i\, \text{ArcTan}[a x] \text{PolyLog}\left[2, i\, e^{i\, \text{ArcTan}[a x]}\right] + 201\,600\, \text{PolyLog}\left[3, -i\, e^{i\, \text{ArcTan}[a x]}\right] - 201\,600\, \text{PolyLog}\left[3, i\, e^{i\, \text{ArcTan}[a x]}\right] +$$

$$17\,622\, \text{Sin}[3 \text{ArcTan}[a x]] + 11\,352\, a^2 x^2 \text{Sin}[3 \text{ArcTan}[a x]] - 17\,916\, a^4 x^4 \text{Sin}[3 \text{ArcTan}[a x]] + 600\, a^6 x^6 \text{Sin}[3 \text{ArcTan}[a x]] +$$

$$12\,246\, a^8 x^8 \text{Sin}[3 \text{ArcTan}[a x]] - 490\,455\, \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]] - 1\,484\,700\, a^2 x^2 \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]] -$$

$$1\,592\,010\, a^4 x^4 \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]] - 691\,740\, a^6 x^6 \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]] - 93\,975\, a^8 x^8 \text{ArcTan}[a x]^2 \text{Sin}[3 \text{ArcTan}[a x]] -$$

$$15\,618\, \text{Sin}[5 \text{ArcTan}[a x]] - 39\,176\, a^2 x^2 \text{Sin}[5 \text{ArcTan}[a x]] - 23\,820\, a^4 x^4 \text{Sin}[5 \text{ArcTan}[a x]] + 7416\, a^6 x^6 \text{Sin}[5 \text{ArcTan}[a x]] +$$

$$7678\, a^8 x^8 \text{Sin}[5 \text{ArcTan}[a x]] + 61\,845\, \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]] + 227\,220\, a^2 x^2 \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]] +$$

$$310\,590\, a^4 x^4 \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]] + 186\,900\, a^6 x^6 \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]] + 41\,685\, a^8 x^8 \text{ArcTan}[a x]^2 \text{Sin}[5 \text{ArcTan}[a x]] +$$

$$2438\, \text{Sin}[7 \text{ArcTan}[a x]] + 9752\, a^2 x^2 \text{Sin}[7 \text{ArcTan}[a x]] + 14\,628\, a^4 x^4 \text{Sin}[7 \text{ArcTan}[a x]] + 9752\, a^6 x^6 \text{Sin}[7 \text{ArcTan}[a x]] +$$

$$2438\, a^8 x^8 \text{Sin}[7 \text{ArcTan}[a x]] - 1575\, \text{ArcTan}[a x]^2 \text{Sin}[7 \text{ArcTan}[a x]] - 6300\, a^2 x^2 \text{ArcTan}[a x]^2 \text{Sin}[7 \text{ArcTan}[a x]] -$$

$$\left. 9450\, a^4 x^4 \text{ArcTan}[a x]^2 \text{Sin}[7 \text{ArcTan}[a x]] - 6300\, a^6 x^6 \text{ArcTan}[a x]^2 \text{Sin}[7 \text{ArcTan}[a x]] - 1575\, a^8 x^8 \text{ArcTan}[a x]^2 \text{Sin}[7 \text{ArcTan}[a x]]\right)$$

Problem 325: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 387 leaves, 6 steps):

$$\frac{5 c^2 \sqrt{c + a^2 c x^2}}{56 a^2} + \frac{5 c \left(c + a^2 c x^2\right)^{3/2}}{252 a^2} + \frac{\left(c + a^2 c x^2\right)^{5/2}}{105 a^2} - \frac{5 c^2 x \sqrt{c + a^2 c x^2} \text{ArcTan}[a x]}{56 a} - \frac{5 c x \left(c + a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]}{84 a} - \frac{x \left(c + a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]}{21 a} + \frac{\left(c + a^2 c x^2\right)^{7/2} \text{ArcTan}[a x]^2}{7 a^2 c} + \frac{5 i c^3 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x] \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{28 a^2 \sqrt{c + a^2 c x^2}} - \frac{5 i c^3 \sqrt{1 + a^2 x^2} \text{PolyLog}\left[2, -\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{56 a^2 \sqrt{c + a^2 c x^2}} + \frac{5 i c^3 \sqrt{1 + a^2 x^2} \text{PolyLog}\left[2, \frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{56 a^2 \sqrt{c + a^2 c x^2}}$$

Result (type 4, 1087 leaves):

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

$$\frac{1}{480 a^2} c^2 \left(1+a^2 x^2\right)^2 \sqrt{c \left(1+a^2 x^2\right)} \left(50-32 \text{ArcTan}[a x]^2+72 \text{Cos}[2 \text{ArcTan}[a x]]+160 \text{ArcTan}[a x]^2 \text{Cos}[2 \text{ArcTan}[a x]]+22 \text{Cos}[4 \text{ArcTan}[a x]]-\frac{110 \text{ArcTan}[a x] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-55 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-11 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+\frac{110 \text{ArcTan}[a x] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+55 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]+11 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-\frac{176 i \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{5/2}}+\frac{176 i \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{5/2}}+4 \text{ArcTan}[a x] \text{Sin}[2 \text{ArcTan}[a x]]-22 \text{ArcTan}[a x] \text{Sin}[4 \text{ArcTan}[a x]]\right)+$$

$$\frac{1}{161280 a^2} c^2 \left(1+a^2 x^2\right)^3 \sqrt{c \left(1+a^2 x^2\right)} \left(4116+10944 \text{ArcTan}[a x]^2+6262 \text{Cos}[2 \text{ArcTan}[a x]]-5376 \text{ArcTan}[a x]^2 \text{Cos}[2 \text{ArcTan}[a x]]+2764 \text{Cos}[4 \text{ArcTan}[a x]]+6720 \text{ArcTan}[a x]^2 \text{Cos}[4 \text{ArcTan}[a x]]+618 \text{Cos}[6 \text{ArcTan}[a x]]-\frac{10815 \text{ArcTan}[a x] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-6489 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-2163 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-309 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+\frac{10815 \text{ArcTan}[a x] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+6489 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]+2163 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]+309 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-\frac{19776 i \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{7/2}}+\frac{19776 i \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{7/2}}-1266 \text{ArcTan}[a x] \text{Sin}[2 \text{ArcTan}[a x]]+360 \text{ArcTan}[a x] \text{Sin}[4 \text{ArcTan}[a x]]-618 \text{ArcTan}[a x] \text{Sin}[6 \text{ArcTan}[a x]]\right)$$

Problem 326: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 516 leaves, 21 steps):

$$\frac{17}{180} c^2 x \sqrt{c+a^2 c x^2}+\frac{1}{60} c x \left(c+a^2 c x^2\right)^{3/2}-\frac{5 c^2 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]}{8 a}-\frac{5 c \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]}{36 a}-\frac{\left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]}{15 a}+\frac{5}{16} c^2 x \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2+\frac{5}{24} c x \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^2+\frac{1}{6} x \left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]^2-\frac{5 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^2}{8 a \sqrt{c+a^2 c x^2}}+\frac{259 c^{5/2} \text{ArcTanh}\left[\frac{a \sqrt{c} x}{\sqrt{c+a^2 c x^2}}\right]}{360 a}+\frac{5 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{8 a \sqrt{c+a^2 c x^2}}-\frac{5 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{8 a \sqrt{c+a^2 c x^2}}-\frac{5 c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{8 a \sqrt{c+a^2 c x^2}}+\frac{5 c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{8 a \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1117 leaves):

$$\frac{1}{11520\, a \sqrt{1+a^2 x^2}} c^2 \sqrt{c+a^2 c x^2} \Bigg(424\, a x \sqrt{1+a^2 x^2} + 368\, a^3 x^3 \sqrt{1+a^2 x^2} - 56\, a^5 x^5 \sqrt{1+a^2 x^2} - 11028 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] + 504\, a^2 x^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] +$$
$$12\, a^4 x^4 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] + 11970\, a x \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 + 7380\, a^3 x^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 +$$
$$1170\, a^5 x^5 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 + 1550\, \text{ArcTan}[a x]\, \text{Cos}[3\, \text{ArcTan}[a x]] + 3210\, a^2 x^2\, \text{ArcTan}[a x]\, \text{Cos}[3\, \text{ArcTan}[a x]] +$$
$$1770\, a^4 x^4\, \text{ArcTan}[a x]\, \text{Cos}[3\, \text{ArcTan}[a x]] + 110\, a^6 x^6\, \text{ArcTan}[a x]\, \text{Cos}[3\, \text{ArcTan}[a x]] - 90\, \text{ArcTan}[a x]\, \text{Cos}[5\, \text{ArcTan}[a x]] -$$
$$270\, a^2 x^2\, \text{ArcTan}[a x]\, \text{Cos}[5\, \text{ArcTan}[a x]] - 270\, a^4 x^4\, \text{ArcTan}[a x]\, \text{Cos}[5\, \text{ArcTan}[a x]] - 90\, a^6 x^6\, \text{ArcTan}[a x]\, \text{Cos}[5\, \text{ArcTan}[a x]] -$$
$$6480\, \pi\, \text{ArcTan}[a x]\, \text{Log}[2] + 960\, \pi\, \text{ArcTan}[a x]\, \text{Log}[8] + 3600\, \text{ArcTan}[a x]^2\, \text{Log}\left[1 - i\, e^{i\, \text{ArcTan}[a x]}\right] -$$
$$3600\, \text{ArcTan}[a x]^2\, \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a x]}\right] + 3600\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\left(-\frac{1}{2} - \frac{i}{2}\right) e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left(-i + e^{i\, \text{ArcTan}[a x]}\right)\right] -$$
$$3600\, \text{ArcTan}[a x]^2\, \text{Log}\left[\left(\frac{1}{2} + \frac{i}{2}\right) e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left(-i + e^{i\, \text{ArcTan}[a x]}\right)\right] + 3600\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left((1+i) + (1-i)\, e^{i\, \text{ArcTan}[a x]}\right)\right] +$$
$$3600\, \text{ArcTan}[a x]^2\, \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left((1+i) + (1-i)\, e^{i\, \text{ArcTan}[a x]}\right)\right] - 3600\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[-\text{Cos}\left[\frac{1}{4} (\pi + 2\, \text{ArcTan}[a x])\right]\right] -$$
$$8288\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] + 3600\, \text{ArcTan}[a x]^2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] +$$
$$8288\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] - 3600\, \text{ArcTan}[a x]^2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] -$$
$$3600\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\text{Sin}\left[\frac{1}{4} (\pi + 2\, \text{ArcTan}[a x])\right]\right] + 7200\, i\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2, -i\, e^{i\, \text{ArcTan}[a x]}\right] -$$
$$7200\, i\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2, i\, e^{i\, \text{ArcTan}[a x]}\right] - 7200\, \text{PolyLog}\left[3, -i\, e^{i\, \text{ArcTan}[a x]}\right] + 7200\, \text{PolyLog}\left[3, i\, e^{i\, \text{ArcTan}[a x]}\right] +$$
$$372\, \text{Sin}[3\, \text{ArcTan}[a x]] + 636\, a^2 x^2\, \text{Sin}[3\, \text{ArcTan}[a x]] + 156\, a^4 x^4\, \text{Sin}[3\, \text{ArcTan}[a x]] - 108\, a^6 x^6\, \text{Sin}[3\, \text{ArcTan}[a x]] -$$
$$1425\, \text{ArcTan}[a x]^2\, \text{Sin}[3\, \text{ArcTan}[a x]] - 3555\, a^2 x^2\, \text{ArcTan}[a x]^2\, \text{Sin}[3\, \text{ArcTan}[a x]] - 2835\, a^4 x^4\, \text{ArcTan}[a x]^2\, \text{Sin}[3\, \text{ArcTan}[a x]] -$$
$$705\, a^6 x^6\, \text{ArcTan}[a x]^2\, \text{Sin}[3\, \text{ArcTan}[a x]] - 52\, \text{Sin}[5\, \text{ArcTan}[a x]] - 156\, a^2 x^2\, \text{Sin}[5\, \text{ArcTan}[a x]] -$$
$$156\, a^4 x^4\, \text{Sin}[5\, \text{ArcTan}[a x]] - 52\, a^6 x^6\, \text{Sin}[5\, \text{ArcTan}[a x]] + 45\, \text{ArcTan}[a x]^2\, \text{Sin}[5\, \text{ArcTan}[a x]] +$$
$$135\, a^2 x^2\, \text{ArcTan}[a x]^2\, \text{Sin}[5\, \text{ArcTan}[a x]] + 135\, a^4 x^4\, \text{ArcTan}[a x]^2\, \text{Sin}[5\, \text{ArcTan}[a x]] + 45\, a^6 x^6\, \text{ArcTan}[a x]^2\, \text{Sin}[5\, \text{ArcTan}[a x]]\Bigg)$$

Problem 413: Result more than twice size of optimal antiderivative.

$$\int x^2 \sqrt{c + a^2 c x^2}\, \text{ArcTan}[a x]^3\, dx$$

Optimal (type 4, 747 leaves, 40 steps) :

$$-\frac{\sqrt{c+a^2 c x^2}}{4 a^3}+\frac{x \sqrt{c+a^2 c x^2}\;\text{ArcTan}[a x]}{4 a^2}+\frac{\sqrt{c+a^2 c x^2}\;\text{ArcTan}[a x]^2}{8 a^3}-\frac{x^2 \sqrt{c+a^2 c x^2}\;\text{ArcTan}[a x]^2}{4 a}+\frac{x \sqrt{c+a^2 c x^2}\;\text{ArcTan}[a x]^3}{8 a^2}+$$

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

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

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

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

Result (type 4, 1844 leaves):

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

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

$$\frac{1}{8 \sqrt{1+a^2 x^2}} \sqrt{c\left(1+a^2 x^2\right)}\;\left(-\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]-\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.\right.$$

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

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-\mathrm{e}^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+\mathrm{e}^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+2\,\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.$$

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

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

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

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

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

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+\frac{\sqrt{c\left(1+a^2x^2\right)}\left(2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2+\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

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

$$\left.\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 415: Result more than twice size of optimal antiderivative.

$$\int\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 626 leaves, 14 steps):

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

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

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

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

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

Result (type 4, 1524 leaves) :

$$\frac{1}{a}\Bigg(-\frac{3\sqrt{c\,(1+a^2x^2)}\;\text{ArcTan}[a\,x]^2}{2\sqrt{1+a^2x^2}}+\frac{1}{\sqrt{1+a^2x^2}}$$

$$3\sqrt{c\,(1+a^2x^2)}\;(\text{ArcTan}[a\,x]\;(\text{Log}[1-i\,e^{i\,\text{ArcTan}[a\,x]}]-\text{Log}[1+i\,e^{i\,\text{ArcTan}[a\,x]}])+i\,(\text{PolyLog}[2,-i\,e^{i\,\text{ArcTan}[a\,x]}]-\text{PolyLog}[2,i\,e^{i\,\text{ArcTan}[a\,x]}]))+$$

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\;\Big(\frac{1}{8}\pi^3\,\text{Log}[\text{Cot}[\tfrac{1}{2}(\tfrac{\pi}{2}-\text{ArcTan}[a\,x])]]+\frac{3}{4}\pi^2\,((\tfrac{\pi}{2}-\text{ArcTan}[a\,x])$$

$$(\text{Log}[1-e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\text{Log}[1+e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}])+i\,(\text{PolyLog}[2,-e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\text{PolyLog}[2,e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]))-$$

$$\frac{3}{2}\pi\,((\tfrac{\pi}{2}-\text{ArcTan}[a\,x])^2\,(\text{Log}[1-e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\text{Log}[1+e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}])+2\,i\,(\tfrac{\pi}{2}-\text{ArcTan}[a\,x])$$

$$(\text{PolyLog}[2,-e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\text{PolyLog}[2,e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}])+2\,(-\text{PolyLog}[3,-e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]+\text{PolyLog}[3,e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]))+$$

$$8\,\Big(\frac{1}{64}\,i\,(\tfrac{\pi}{2}-\text{ArcTan}[a\,x])^4+\frac{1}{4}\,i\,(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))^4-\frac{1}{8}(\tfrac{\pi}{2}-\text{ArcTan}[a\,x])^3\,\text{Log}[1+e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-$$

$$\frac{1}{8}\pi^3\,(i\,(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))-\text{Log}[1+e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}])-(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))^3\,\text{Log}[1+e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]+$$

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

$$(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))\,\text{Log}[1+e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]+\frac{1}{2}\,i\,\text{PolyLog}[2,-e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}])+$$

$$\frac{3}{2}\,i\,(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))^2\,\text{PolyLog}[2,-e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]-\frac{3}{4}(\tfrac{\pi}{2}-\text{ArcTan}[a\,x])\,\text{PolyLog}[3,-e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-$$

$$\frac{3}{2}\pi\,(\tfrac{1}{3}\,i\,(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))^3-(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))^2\,\text{Log}[1+e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]+i\,(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))$$

$$\text{PolyLog}[2,-e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]-\frac{1}{2}\text{PolyLog}[3,-e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}])-\frac{3}{2}(\tfrac{\pi}{2}+\tfrac{1}{2}(-\tfrac{\pi}{2}+\text{ArcTan}[a\,x]))$$

$$\text{PolyLog}[3,-e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]-\frac{3}{4}\,i\,\text{PolyLog}[4,-e^{i(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\frac{3}{4}\,i\,\text{PolyLog}[4,-e^{2i(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]\Big)\Big)+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\;\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\;(\text{Cos}[\frac{1}{2}\text{ArcTan}[a\,x]]-\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]])^2}-\frac{3\sqrt{c\,(1+a^2x^2)}\;\text{ArcTan}[a\,x]^2\,\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]]}{2\sqrt{1+a^2x^2}\;(\text{Cos}[\frac{1}{2}\text{ArcTan}[a\,x]]-\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]])}-$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\;\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\;(\text{Cos}[\frac{1}{2}\text{ArcTan}[a\,x]]+\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]])^2}+$$

$$\frac{3\sqrt{c\,(1+a^2x^2)}\;\text{ArcTan}[a\,x]^2\,\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]]}{2\sqrt{1+a^2x^2}\;(\text{Cos}[\frac{1}{2}\text{ArcTan}[a\,x]]+\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]])}\Bigg)$$

Problem 420: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 652 leaves, 200 steps):

$$\frac{c x \sqrt{c+a^2 c x^2}}{420 a^3}-\frac{c x^3 \sqrt{c+a^2 c x^2}}{140 a}-\frac{163 c \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]}{840 a^4}+\frac{c x^2 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]}{60 a^2}+\frac{1}{35} c x^4 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]+\frac{9 c x \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2}{112 a^3}-\frac{23 c x^3 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2}{280 a}-\frac{1}{14} a c x^5 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2-\frac{51 i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^2}{280 a^4 \sqrt{c+a^2 c x^2}}-\frac{2 c \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^3}{35 a^4}+\frac{c x^2 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^3}{35 a^2}+\frac{8}{35} c x^4 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^3+\frac{1}{7} a^2 c x^6 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^3+\frac{23 c^{3/2} \text{ArcTanh}\left[\frac{a \sqrt{c}\, x}{\sqrt{c+a^2 c x^2}}\right]}{120 a^4}+\frac{51 i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{280 a^4 \sqrt{c+a^2 c x^2}}-\frac{51 i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{280 a^4 \sqrt{c+a^2 c x^2}}-\frac{51 c^2 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{280 a^4 \sqrt{c+a^2 c x^2}}+\frac{51 c^2 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{280 a^4 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1306 leaves):

$$\frac{1}{a^4} c \left(-\frac{1}{40 \sqrt{1+a^2 x^2}} \sqrt{c \left(1+a^2 x^2\right)} \left(11 \pi \text{ArcTan}[a x] \text{Log}[2]-11 \text{ArcTan}[a x]^2 \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+11 \text{ArcTan}[a x]^2 \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-11 \pi \text{ArcTan}[a x] \text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right) e^{-\frac{1}{2} i \text{ArcTan}[a x]} \left(-i+e^{i \text{ArcTan}[a x]}\right)\right]+11 \text{ArcTan}[a x]^2 \text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right) e^{-\frac{1}{2} i \text{ArcTan}[a x]} \left(-i+e^{i \text{ArcTan}[a x]}\right)\right]-11 \pi \text{ArcTan}[a x] \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \text{ArcTan}[a x]} \left((1+i)+(1-i) e^{i \text{ArcTan}[a x]}\right)\right]-11 \text{ArcTan}[a x]^2 \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \text{ArcTan}[a x]} \left((1+i)+(1-i) e^{i \text{ArcTan}[a x]}\right)\right]+11 \pi \text{ArcTan}[a x] \text{Log}\left[-\text{Cos}\left[\frac{1}{4} (\pi+2 \text{ArcTan}[a x])\right]\right]+20 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]-11 \text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]-20 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]+11 \text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]+11 \pi \text{ArcTan}[a x] \text{Log}\left[\text{Sin}\left[\frac{1}{4} (\pi+2 \text{ArcTan}[a x])\right]\right]-22 i \text{ArcTan}[a x] \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]+22 i \text{ArcTan}[a x] \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]+22 \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]-22 \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]\right)-$$

$$\frac{1}{960}\left(1+a^2x^2\right)^2\sqrt{c\left(1+a^2x^2\right)}\left(150\,\text{ArcTan}[a\,x]-32\,\text{ArcTan}[a\,x]^3+8\,\text{ArcTan}[a\,x]\left(27+20\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[2\,\text{ArcTan}[a\,x]]+\right.$$
$$66\,\text{ArcTan}[a\,x]\,\text{Cos}[4\,\text{ArcTan}[a\,x]]+12\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+$$
$$\left.6\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-33\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]\right)\Bigg)+$$

$$\frac{1}{a^4}c\left(\frac{1}{1680\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]-309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+\right.\right.$$
$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]+$$
$$518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$
$$518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-618\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$\left.618\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+618\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-618\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)-$$
$$\frac{1}{53\,760}\left(1+a^2x^2\right)^3\sqrt{c\left(1+a^2x^2\right)}\left(-4116\,\text{ArcTan}[a\,x]-3648\,\text{ArcTan}[a\,x]^3+2\,\text{ArcTan}[a\,x]\left(-3131+896\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[2\,\text{ArcTan}[a\,x]]-\right.$$
$$4\,\text{ArcTan}[a\,x]\left(691+560\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[4\,\text{ArcTan}[a\,x]]-618\,\text{ArcTan}[a\,x]\,\text{Cos}[6\,\text{ArcTan}[a\,x]]-$$
$$404\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+633\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]-352\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-$$
$$\left.180\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-100\,\text{Sin}[6\,\text{ArcTan}[a\,x]]+309\,\text{ArcTan}[a\,x]^2\,\text{Sin}[6\,\text{ArcTan}[a\,x]]\right)\Bigg)$$

Problem 421: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 882 leaves, 108 steps) :

$$-\frac{c\sqrt{c+a^2 c x^2}}{30 a^3}-\frac{\left(c+a^2 c x^2\right)^{3/2}}{60 a^3}+\frac{c x\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]}{12 a^2}+\frac{1}{20} c x^3\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]+\frac{31 c\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^2}{240 a^3}-$$

$$\frac{19 c x^2\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^2}{120 a}-\frac{1}{10} a c x^4\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^2+\frac{c x\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^3}{16 a^2}+\frac{7}{24} c x^3\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^3+$$

$$\frac{1}{6} a^2 c x^5\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^3+\frac{i c^2\sqrt{1+a^2 x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a x]}\right]\text{ArcTan}[a x]^3}{8 a^3\sqrt{c+a^2 c x^2}}+\frac{41 i c^2\sqrt{1+a^2 x^2}\,\text{ArcTan}[a x]\,\text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{60 a^3\sqrt{c+a^2 c x^2}}-$$

$$\frac{3 i c^2\sqrt{1+a^2 x^2}\,\text{ArcTan}[a x]^2\,\text{PolyLog}\left[2,-i e^{i\,\text{ArcTan}[a x]}\right]}{16 a^3\sqrt{c+a^2 c x^2}}+\frac{3 i c^2\sqrt{1+a^2 x^2}\,\text{ArcTan}[a x]^2\,\text{PolyLog}\left[2,i e^{i\,\text{ArcTan}[a x]}\right]}{16 a^3\sqrt{c+a^2 c x^2}}-$$

$$\frac{41 i c^2\sqrt{1+a^2 x^2}\,\text{PolyLog}\left[2,-\frac{i\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{120 a^3\sqrt{c+a^2 c x^2}}+\frac{41 i c^2\sqrt{1+a^2 x^2}\,\text{PolyLog}\left[2,\frac{i\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{120 a^3\sqrt{c+a^2 c x^2}}+\frac{3 c^2\sqrt{1+a^2 x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\left[3,-i e^{i\,\text{ArcTan}[a x]}\right]}{8 a^3\sqrt{c+a^2 c x^2}}-$$

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

Result (type 4, 4015 leaves) :

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

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

$$\frac{1}{8\sqrt{1+a^2 x^2}}\sqrt{c\left(1+a^2 x^2\right)}\left(-\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]-\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.\right.$$

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

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+2 i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.$$

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

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

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

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

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

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

$$\pi\left(\frac{1}{3}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)^2 \mathrm{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)\right.$$

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

$$\mathrm{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)}\right]-\frac{3}{4}\,i\,\mathrm{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\,i\,\mathrm{PolyLog}\left[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)}\right]\Big]\Big)\Big)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^4}+\frac{\sqrt{c\left(1+a^2x^2\right)}\left(2\,\mathrm{ArcTan}[a\,x]-\mathrm{ArcTan}[a\,x]^2-\mathrm{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2\,\mathrm{ArcTan}[a\,x]-\mathrm{ArcTan}[a\,x]^2+\mathrm{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^2}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}{4\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}+$$

$$\left.\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}{4\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}\right)+$$

$$\frac{1}{a^3}\,c\left(\frac{\sqrt{c\left(1+a^2x^2\right)}\left(50-19\,\mathrm{ArcTan}[a\,x]^2\right)}{240\sqrt{1+a^2x^2}}+\frac{1}{120\sqrt{1+a^2x^2}}19\sqrt{c\left(1+a^2x^2\right)}\right.$$

$$\left(\mathrm{ArcTan}[a\,x]\left(\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]\right)+i\left(\mathrm{PolyLog}\left[2,-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\mathrm{PolyLog}\left[2,i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]\right)\right)+$$

$$\frac{1}{16\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(\frac{1}{8}\pi^3\,\mathrm{Log}\left[\mathrm{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)\right]\right]+\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)\right.\right.$$

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

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

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

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

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

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

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

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

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

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-5\,\text{ArcTan}[a\,x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2-52\,\text{ArcTan}[a\,x]+26\,\text{ArcTan}[a\,x]^2+15\,\text{ArcTan}[a\,x]^3\right)}{480\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{ArcTan}[a x]-\text{ArcTan}[a x]^2+5\,\text{ArcTan}[a x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2+52\,\text{ArcTan}[a x]+26\,\text{ArcTan}[a x]^2-15\,\text{ArcTan}[a x]^3\right)}{480\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-19\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}{240\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-13\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}{120\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+13\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}{120\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3}+$$

$$\left.\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+19\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}{240\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}\right)$$

Problem 422: Result more than twice size of optimal antiderivative.

$$\int x\left(c+a^2cx^2\right)^{3/2}\text{ArcTan}[a x]^3\,dx$$

Optimal (type 4, 477 leaves, 17 steps):

$$-\frac{c x\sqrt{c+a^2cx^2}}{20a}+\frac{9c\sqrt{c+a^2cx^2}\,\text{ArcTan}[a x]}{20a^2}+\frac{\left(c+a^2cx^2\right)^{3/2}\text{ArcTan}[a x]}{10a^2}-$$

$$\frac{9c x\sqrt{c+a^2cx^2}\,\text{ArcTan}[a x]^2}{40a}-\frac{3x\left(c+a^2cx^2\right)^{3/2}\text{ArcTan}[a x]^2}{20a}+\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a x]}\right]\text{ArcTan}[a x]^2}{20a^2\sqrt{c+a^2cx^2}}+$$

$$\frac{\left(c+a^2cx^2\right)^{5/2}\text{ArcTan}[a x]^3}{5a^2c}-\frac{c^{3/2}\,\text{ArcTanh}\left[\frac{a\sqrt{c}\,x}{\sqrt{c+a^2cx^2}}\right]}{2a^2}-\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a x]}\right]}{20a^2\sqrt{c+a^2cx^2}}+$$

$$\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a x]}\right]}{20a^2\sqrt{c+a^2cx^2}}+\frac{9c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a x]}\right]}{20a^2\sqrt{c+a^2cx^2}}-\frac{9c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a x]}\right]}{20a^2\sqrt{c+a^2cx^2}}$$

Result (type 4, 1188 leaves):

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

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

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

$$\pi\, \text{ArcTan}[a x]\, \text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi + 2\, \text{ArcTan}[a x]\right)\right]\right] + 2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] -$$

$$\text{ArcTan}[a x]^2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] - 2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] +$$

$$\text{ArcTan}[a x]^2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] + \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi + 2\, \text{ArcTan}[a x]\right)\right]\right] - 2\, i\, \text{ArcTan}[a x]$$

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

$$\left.\frac{1}{12}\left(1+a^2 x^2\right) \sqrt{c\left(1+a^2 x^2\right)}\, \text{ArcTan}[a x] \left(6 + 4\, \text{ArcTan}[a x]^2 + 6\, \text{Cos}[2\, \text{ArcTan}[a x]] - 3\, \text{ArcTan}[a x]\, \text{Sin}[2\, \text{ArcTan}[a x]]\right)\right) +$$

$$\frac{1}{a^2} c \left(-\frac{1}{40\sqrt{1+a^2 x^2}} \sqrt{c\left(1+a^2 x^2\right)} \left(11\, \pi\, \text{ArcTan}[a x]\, \text{Log}[2] - 11\, \text{ArcTan}[a x]^2\, \text{Log}\left[1 - i\, e^{i\, \text{ArcTan}[a x]}\right] + \right.\right.$$

$$11\, \text{ArcTan}[a x]^2\, \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a x]}\right] - 11\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\left(-\frac{1}{2} - \frac{i}{2}\right) e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left(-i + e^{i\, \text{ArcTan}[a x]}\right)\right] +$$

$$11\, \text{ArcTan}[a x]^2\, \text{Log}\left[\left(\frac{1}{2} + \frac{i}{2}\right) e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left(-i + e^{i\, \text{ArcTan}[a x]}\right)\right] - 11\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left((1+i) + (1-i)\, e^{i\, \text{ArcTan}[a x]}\right)\right] -$$

$$11\, \text{ArcTan}[a x]^2\, \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left((1+i) + (1-i)\, e^{i\, \text{ArcTan}[a x]}\right)\right] + 11\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi + 2\, \text{ArcTan}[a x]\right)\right]\right] +$$

$$20\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] - 11\, \text{ArcTan}[a x]^2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] -$$

$$20\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] + 11\, \text{ArcTan}[a x]^2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] +$$

$$11\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi + 2\, \text{ArcTan}[a x]\right)\right]\right] - 22\, i\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2, -i\, e^{i\, \text{ArcTan}[a x]}\right] +$$

$$\left.22\, i\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2, i\, e^{i\, \text{ArcTan}[a x]}\right] + 22\, \text{PolyLog}\left[3, -i\, e^{i\, \text{ArcTan}[a x]}\right] - 22\, \text{PolyLog}\left[3, i\, e^{i\, \text{ArcTan}[a x]}\right]\right) -$$

$$\frac{1}{960}\left(1+a^2 x^2\right)^2 \sqrt{c\left(1+a^2 x^2\right)} \left(150\, \text{ArcTan}[a x] - 32\, \text{ArcTan}[a x]^3 + 8\, \text{ArcTan}[a x]\left(27 + 20\, \text{ArcTan}[a x]^2\right) \text{Cos}[2\, \text{ArcTan}[a x]] + \right.$$

$$66\, \text{ArcTan}[a x]\, \text{Cos}[4\, \text{ArcTan}[a x]] + 12\, \text{Sin}[2\, \text{ArcTan}[a x]] + 6\, \text{ArcTan}[a x]^2\, \text{Sin}[2\, \text{ArcTan}[a x]] +$$

$$\left.\left.6\, \text{Sin}[4\, \text{ArcTan}[a x]] - 33\, \text{ArcTan}[a x]^2\, \text{Sin}[4\, \text{ArcTan}[a x]]\right)\right)$$

Problem 423: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 760 leaves, 18 steps):

$$-\frac{c\sqrt{c+a^2 c x^2}}{4a}+\frac{1}{4}c x\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]-\frac{9c\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^2}{8a}-\frac{(c+a^2 c x^2)^{3/2}\,\text{ArcTan}[a x]^2}{4a}+\frac{3}{8}c x\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^3+$$

$$\frac{1}{4}x\,(c+a^2 c x^2)^{3/2}\,\text{ArcTan}[a x]^3-\frac{3 i c^2\sqrt{1+a^2x^2}\,\text{ArcTan}\big[e^{i\,\text{ArcTan}[a x]}\big]\,\text{ArcTan}[a x]^3}{4a\sqrt{c+a^2 c x^2}}-\frac{5 i c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{ArcTan}\Big[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\Big]}{a\sqrt{c+a^2 c x^2}}+$$

$$\frac{9 i c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]^2\,\text{PolyLog}\big[2,-i e^{i\,\text{ArcTan}[a x]}\big]}{8a\sqrt{c+a^2 c x^2}}-\frac{9 i c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]^2\,\text{PolyLog}\big[2,i e^{i\,\text{ArcTan}[a x]}\big]}{8a\sqrt{c+a^2 c x^2}}+$$

$$\frac{5 i c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\Big[2,-\frac{i\sqrt{1+i a x}}{\sqrt{1-i a x}}\Big]}{2a\sqrt{c+a^2 c x^2}}-\frac{5 i c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\Big[2,\frac{i\sqrt{1+i a x}}{\sqrt{1-i a x}}\Big]}{2a\sqrt{c+a^2 c x^2}}-\frac{9 c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\big[3,-i e^{i\,\text{ArcTan}[a x]}\big]}{4a\sqrt{c+a^2 c x^2}}+$$

$$\frac{9 c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\big[3,i e^{i\,\text{ArcTan}[a x]}\big]}{4a\sqrt{c+a^2 c x^2}}-\frac{9 i c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\big[4,-i e^{i\,\text{ArcTan}[a x]}\big]}{4a\sqrt{c+a^2 c x^2}}+\frac{9 i c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\big[4,i e^{i\,\text{ArcTan}[a x]}\big]}{4a\sqrt{c+a^2 c x^2}}$$

Result (type 4, 3371 leaves):

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

$$\Big(\text{ArcTan}[a x]\,\big(\text{Log}\big[1-i e^{i\,\text{ArcTan}[a x]}\big]-\text{Log}\big[1+i e^{i\,\text{ArcTan}[a x]}\big]\big)+i\,\big(\text{PolyLog}\big[2,-i e^{i\,\text{ArcTan}[a x]}\big]-\text{PolyLog}\big[2,i e^{i\,\text{ArcTan}[a x]}\big]\big)\Big)+$$

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\,\Bigg(\frac{1}{8}\pi^3\,\text{Log}\Big[\text{Cot}\Big[\frac{1}{2}\Big(\frac{\pi}{2}-\text{ArcTan}[a x]\Big)\Big]\Big]+\frac{3}{4}\pi^2\,\Bigg(\Big(\frac{\pi}{2}-\text{ArcTan}[a x]\Big)$$

$$\Big(\text{Log}\Big[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]-\text{Log}\Big[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]\Big)+i\,\Big(\text{PolyLog}\Big[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]-\text{PolyLog}\Big[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]\Big)\Bigg)-$$

$$\frac{3}{2}\pi\,\Bigg(\Big(\frac{\pi}{2}-\text{ArcTan}[a x]\Big)^2\Big(\text{Log}\Big[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]-\text{Log}\Big[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]\Big)+2i\,\Big(\frac{\pi}{2}-\text{ArcTan}[a x]\Big)$$

$$\Big(\text{PolyLog}\Big[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]-\text{PolyLog}\Big[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]\Big)+2\,\Big(-\text{PolyLog}\Big[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]+\text{PolyLog}\Big[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\Big]\Big)\Bigg)+$$

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

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

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

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

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

$$\pi \left(\frac{1}{3} i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2 \text{Log}\left[1+e^{2 i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\right.$$

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

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

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

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^3}{4 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^2}+$$

$$\left.\frac{3 \sqrt{c\left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^2 \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{2 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)}\right)+$$

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

$$\sqrt{c\left(1+a^2 x^2\right)}$$

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

$$\frac{1}{8 \sqrt{1+a^2 x^2}} \sqrt{c\left(1+a^2 x^2\right)}\left(-\frac{1}{8} \pi^3 \text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]-\frac{3}{4} \pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.\right.$$

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

$$\frac{3}{2} \pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i \left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i \left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+2 i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.$$

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

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

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

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

$$\left.\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)\mathrm{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}\,i\,\mathrm{PolyLog}\left[2,\,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

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

$$\pi\left(\frac{1}{3}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)^2\mathrm{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\mathrm{ArcTan}[a\,x]\right)\right)\right.$$

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^4}+\frac{\sqrt{c\left(1+a^2x^2\right)}\left(2\,\mathrm{ArcTan}[a\,x]-\mathrm{ArcTan}[a\,x]^2-\mathrm{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2\,\mathrm{ArcTan}[a\,x]-\mathrm{ArcTan}[a\,x]^2+\mathrm{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^2}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}{4\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}+$$

$$\left.\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}{4\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 425: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 901 leaves, 37 steps):

$$-\frac{3}{2} a c \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2-\frac{c \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^3}{x}+\frac{1}{2} a^2 c x \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^3-$$
$$\frac{3 i a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^3}{\sqrt{c+a^2 c x^2}}-\frac{6 i a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{6 a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}[a x]^2 \text{ArcTanh}\left[e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{6 i a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[2,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{9 i a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{2 \sqrt{c+a^2 c x^2}}-\frac{9 i a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{2 \sqrt{c+a^2 c x^2}}-$$
$$\frac{6 i a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[2,e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{3 i a c^2 \sqrt{1+a^2 x^2} \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{3 i a c^2 \sqrt{1+a^2 x^2} \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-\frac{6 a c^2 \sqrt{1+a^2 x^2} \text{PolyLog}\left[3,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{9 a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{9 a c^2 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{6 a c^2 \sqrt{1+a^2 x^2} \text{PolyLog}\left[3,e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{9 i a c^2 \sqrt{1+a^2 x^2} \text{PolyLog}\left[4,-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{9 i a c^2 \sqrt{1+a^2 x^2} \text{PolyLog}\left[4,i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}$$

Result (type 4, 2686 leaves):

$$\frac{1}{128 \sqrt{1+a^2 x^2}} a c \sqrt{c \left(1+a^2 x^2\right)} \text{Csc}\left[\frac{1}{2} \text{ArcTan}[a x]\right]$$
$$\left(-\frac{7 i a \pi^4 x}{\sqrt{1+a^2 x^2}}-\frac{8 i a \pi^3 x \text{ArcTan}[a x]}{\sqrt{1+a^2 x^2}}+\frac{24 i a \pi^2 x \text{ArcTan}[a x]^2}{\sqrt{1+a^2 x^2}}-64 \text{ArcTan}[a x]^3-\frac{32 i a \pi x \text{ArcTan}[a x]^3}{\sqrt{1+a^2 x^2}}+\frac{16 i a x \text{ArcTan}[a x]^4}{\sqrt{1+a^2 x^2}}+\right.$$
$$\frac{48 a \pi^2 x \text{ArcTan}[a x] \text{Log}\left[1-i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{96 a \pi x \text{ArcTan}[a x]^2 \text{Log}\left[1-i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{8 a \pi^3 x \text{Log}\left[1+i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+$$

$$\frac{64\,a\,x\,\text{ArcTan}[a\,x]^3\,\text{Log}\left[1+i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{192\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{8\,a\,\pi^3\,x\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

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

$$\frac{64\,a\,x\,\text{ArcTan}[a\,x]^3\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{192\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{8\,a\,\pi^3\,x\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}\,(\pi+2\,\text{ArcTan}[a\,x])\right]\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{192\,i\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{48\,i\,a\,\pi\,x\,(\pi-4\,\text{ArcTan}[a\,x])\,\text{PolyLog}\left[2,i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{384\,i\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{48\,i\,a\,\pi^2\,x\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

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

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

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

$$\left.\frac{384\,a\,x\,\text{PolyLog}\left[3,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{384\,i\,a\,x\,\text{PolyLog}\left[4,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{384\,i\,a\,x\,\text{PolyLog}\left[4,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}\right)$$

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

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

$$\frac{1}{2\,\sqrt{1+a^2\,x^2}}\,\sqrt{c\,(1+a^2\,x^2)}\,\left(\frac{1}{8}\,\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]+\frac{3}{4}\,\pi^2\,\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right.\right.$$

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

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

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

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

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

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

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

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

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

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

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left.\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 428: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 798 leaves, 547 steps):

$$\frac{85\,c^2\,x\,\sqrt{c+a^2\,c\,x^2}}{12\,096\,a^3}-\frac{c^2\,x^3\,\sqrt{c+a^2\,c\,x^2}}{240\,a}-\frac{1}{504}\,a\,c^2\,x^5\,\sqrt{c+a^2\,c\,x^2}-\frac{6157\,c^2\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]}{60\,480\,a^4}-\frac{47\,c^2\,x^2\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]}{30\,240\,a^2}+$$

$$\frac{67\,c^2\,x^4\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]}{2520}+\frac{1}{84}\,a^2\,c^2\,x^6\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]+\frac{47\,c^2\,x\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2}{896\,a^3}-$$

$$\frac{205\,c^2\,x^3\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2}{4032\,a}-\frac{103\,a\,c^2\,x^5\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2}{1008}-\frac{1}{24}\,a^3\,c^2\,x^7\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2-$$

$$\frac{115\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\,\text{ArcTan}[a\,x]^2}{1344\,a^4\,\sqrt{c+a^2\,c\,x^2}}-\frac{2\,c^2\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^3}{63\,a^4}+\frac{c^2\,x^2\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^3}{63\,a^2}+$$

$$\frac{5}{21}\,c^2\,x^4\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^3+\frac{19}{63}\,a^2\,c^2\,x^6\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^3+\frac{1}{9}\,a^4\,c^2\,x^8\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^3+\frac{1433\,c^{5/2}\,\text{ArcTanh}\left[\frac{a\,\sqrt{c}\,x}{\sqrt{c+a^2\,c\,x^2}}\right]}{15\,120\,a^4}+$$

$$\frac{115\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{1344\,a^4\,\sqrt{c+a^2\,c\,x^2}}-\frac{115\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{1344\,a^4\,\sqrt{c+a^2\,c\,x^2}}-$$

$$\frac{115\,c^3\,\sqrt{1+a^2\,x^2}\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{1344\,a^4\,\sqrt{c+a^2\,c\,x^2}}+\frac{115\,c^3\,\sqrt{1+a^2\,x^2}\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{1344\,a^4\,\sqrt{c+a^2\,c\,x^2}}$$

Result (type 4, 2044 leaves):

$$\frac{1}{a^4}\,c^2$$

$$\left(-\frac{1}{40\,\sqrt{1+a^2\,x^2}}\sqrt{c\,\left(1+a^2\,x^2\right)}\,\left(11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]-11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-11\,\pi\right.\right.$$

$$\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$

$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(\left(1+i\right)+\left(1-i\right)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$

$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(\left(1+i\right)+\left(1-i\right)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\,\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]+$$

$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-$$

$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$$

$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\,\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$

$$\left.22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+22\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-22\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)-$$

$$\frac{1}{960}\,\left(1+a^2\,x^2\right)^2\,\sqrt{c\,\left(1+a^2\,x^2\right)}\,\left(150\,\text{ArcTan}[a\,x]-32\,\text{ArcTan}[a\,x]^3+8\,\text{ArcTan}[a\,x]\,\left(27+20\,\text{ArcTan}[a\,x]^2\right)\,\text{Cos}[2\,\text{ArcTan}[a\,x]]+\right.$$

$$66\,\text{ArcTan}[a\,x]\,\text{Cos}[4\,\text{ArcTan}[a\,x]] + 12\,\text{Sin}[2\,\text{ArcTan}[a\,x]] + 6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]] +$$

$$6\,\text{Sin}[4\,\text{ArcTan}[a\,x]] - 33\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]\Big)\Big) +$$

$$\frac{1}{a^4}\,2\,c^2\left(\frac{1}{1680\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\,\Big(309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2] - 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\big[1 - \mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] +\right.$$

$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\big[1 + \mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] - 309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[\Big(-\frac{1}{2} - \frac{\mathrm{i}}{2}\Big)\,e^{-\frac{1}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,\big(-\mathrm{i} + e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big)\Big] +$$

$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\Big[\Big(\frac{1}{2} + \frac{\mathrm{i}}{2}\Big)\,e^{-\frac{1}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,\big(-\mathrm{i} + e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big)\Big] - 309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[\frac{1}{2}\,e^{-\frac{1}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,\big((1+\mathrm{i}) + (1-\mathrm{i})\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big)\Big] -$$

$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\Big[\frac{1}{2}\,e^{-\frac{1}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,\big((1+\mathrm{i}) + (1-\mathrm{i})\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big)\Big] + 309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[-\text{Cos}\Big[\frac{1}{4}\,(\pi + 2\,\text{ArcTan}[a\,x])\Big]\Big] +$$

$$518\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] - \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] - 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] - \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] -$$

$$518\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] + \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] + 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] + \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] +$$

$$309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[\text{Sin}\Big[\frac{1}{4}\,(\pi + 2\,\text{ArcTan}[a\,x])\Big]\Big] - 618\,\mathrm{i}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\big[2, -\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] +$$

$$618\,\mathrm{i}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\big[2, \mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] + 618\,\text{PolyLog}\big[3, -\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] - 618\,\text{PolyLog}\big[3, \mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big]\Big) -$$

$$\frac{1}{53\,760}\,(1+a^2x^2)^3\sqrt{c\,(1+a^2x^2)}\,\Big(-4116\,\text{ArcTan}[a\,x] - 3648\,\text{ArcTan}[a\,x]^3 + 2\,\text{ArcTan}[a\,x]\,\big(-3131 + 896\,\text{ArcTan}[a\,x]^2\big)\,\text{Cos}[2\,\text{ArcTan}[a\,x]] -$$

$$4\,\text{ArcTan}[a\,x]\,\big(691 + 560\,\text{ArcTan}[a\,x]^2\big)\,\text{Cos}[4\,\text{ArcTan}[a\,x]] - 618\,\text{ArcTan}[a\,x]\,\text{Cos}[6\,\text{ArcTan}[a\,x]] -$$

$$404\,\text{Sin}[2\,\text{ArcTan}[a\,x]] + 633\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]] - 352\,\text{Sin}[4\,\text{ArcTan}[a\,x]] -$$

$$180\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]] - 100\,\text{Sin}[6\,\text{ArcTan}[a\,x]] + 309\,\text{ArcTan}[a\,x]^2\,\text{Sin}[6\,\text{ArcTan}[a\,x]]\Big)\Big) +$$

$$\frac{1}{a^4}\,c^2\left(\frac{1}{120\,960\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\,\Big(16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\big[1 - \mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] - 16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\big[1 + \mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] +\right.$$

$$16\,407\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[\Big(-\frac{1}{2} - \frac{\mathrm{i}}{2}\Big)\,e^{-\frac{1}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,\big(-\mathrm{i} + e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big)\Big] - 16\,407\,\text{ArcTan}[a\,x]^2$$

$$\text{Log}\Big[\Big(\frac{1}{2} + \frac{\mathrm{i}}{2}\Big)\,e^{-\frac{1}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,\big(-\mathrm{i} + e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big)\Big] + 16\,407\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[\frac{1}{2}\,e^{-\frac{1}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,\big((1+\mathrm{i}) + (1-\mathrm{i})\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big)\Big] +$$

$$16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\Big[\frac{1}{2}\,e^{-\frac{1}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,\big((1+\mathrm{i}) + (1-\mathrm{i})\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big)\Big] - 25\,576\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] - \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] + 16\,407$$

$$\text{ArcTan}[a\,x]^2\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] - \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] - 16\,407\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[-\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] + \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] +$$

$$25\,576\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] + \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] - 16\,407\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] + \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] -$$

$$16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big] + \text{Sin}\Big[\frac{1}{2}\,\text{ArcTan}[a\,x]\Big]\Big] + 32\,814\,\mathrm{i}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\big[2, -\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] -$$

$$32814\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right] - 32814\,\text{PolyLog}\left[3,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right] + 32814\,\text{PolyLog}\left[3,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Bigg) -$$

$$\frac{1}{15482880}\left(1+a^2x^2\right)^4\sqrt{c\left(1+a^2x^2\right)}\,\Big(657578\,\text{ArcTan}[a\,x] - 273408\,\text{ArcTan}[a\,x]^3 + 288\,\text{ArcTan}[a\,x]\left(3761+3792\,\text{ArcTan}[a\,x]^2\right)$$
$$\text{Cos}[2\,\text{ArcTan}[a\,x]] - 216\,\text{ArcTan}[a\,x]\left(-2671+896\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[4\,\text{ArcTan}[a\,x]] + 184160\,\text{ArcTan}[a\,x]\,\text{Cos}[6\,\text{ArcTan}[a\,x]] +$$
$$161280\,\text{ArcTan}[a\,x]^3\,\text{Cos}[6\,\text{ArcTan}[a\,x]] + 32814\,\text{ArcTan}[a\,x]\,\text{Cos}[8\,\text{ArcTan}[a\,x]] + 74932\,\text{Sin}[2\,\text{ArcTan}[a\,x]] +$$
$$39222\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]] + 77908\,\text{Sin}[4\,\text{ArcTan}[a\,x]] - 80226\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]] +$$
$$36612\,\text{Sin}[6\,\text{ArcTan}[a\,x]] + 19086\,\text{ArcTan}[a\,x]^2\,\text{Sin}[6\,\text{ArcTan}[a\,x]] + 7238\,\text{Sin}[8\,\text{ArcTan}[a\,x]] - 16407\,\text{ArcTan}[a\,x]^2\,\text{Sin}[8\,\text{ArcTan}[a\,x]]\Big)\Bigg)$$

Problem 429: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 1019 leaves, 293 steps):

$$\frac{13c^2\sqrt{c+a^2c\,x^2}}{6720\,a^3} - \frac{3c\left(c+a^2c\,x^2\right)^{3/2}}{560\,a^3} - \frac{\left(c+a^2c\,x^2\right)^{5/2}}{280\,a^3} + \frac{43c^2x\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]}{1344\,a^2} + \frac{29}{560}c^2x^3\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x] +$$
$$\frac{1}{56}a^2c^2x^5\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x] + \frac{1373c^2\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^2}{13440\,a^3} - \frac{737c^2x^2\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^2}{6720\,a} -$$
$$\frac{83}{560}a\,c^2x^4\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^2 - \frac{3}{56}a^3c^2x^6\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^2 + \frac{5c^2x\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^3}{128\,a^2} +$$
$$\frac{59}{192}c^2x^3\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^3 + \frac{17}{48}a^2c^2x^5\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^3 + \frac{1}{8}a^4c^2x^7\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^3 +$$
$$\frac{5\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\text{ArcTan}[a\,x]^3}{64\,a^3\sqrt{c+a^2c\,x^2}} + \frac{397\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{ArcTan}\left[\frac{\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{840\,a^3\sqrt{c+a^2c\,x^2}} -$$
$$\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{128\,a^3\sqrt{c+a^2c\,x^2}} + \frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{128\,a^3\sqrt{c+a^2c\,x^2}} -$$
$$\frac{397\,i\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[2,\,-\frac{i\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{1680\,a^3\sqrt{c+a^2c\,x^2}} + \frac{397\,i\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[2,\,\frac{i\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{1680\,a^3\sqrt{c+a^2c\,x^2}} +$$
$$\frac{15c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{64\,a^3\sqrt{c+a^2c\,x^2}} - \frac{15c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{64\,a^3\sqrt{c+a^2c\,x^2}} +$$
$$\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[4,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{64\,a^3\sqrt{c+a^2c\,x^2}} - \frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[4,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{64\,a^3\sqrt{c+a^2c\,x^2}}$$

Result (type 4, 6517 leaves) :

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

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

$$\frac{1}{8\sqrt{1+a^2 x^2}} \sqrt{c\,(1+a^2 x^2)} \Bigg(-\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]-\frac{3}{4}\pi^2\,\Bigg(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)$$

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

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

$$\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\Bigg)-$$

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

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

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

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

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

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

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

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

$$\frac{\sqrt{c\,(1+a^2 x^2)}\,\text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+\frac{\sqrt{c\,(1+a^2 x^2)}\,\left(2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2\,\text{ArcTan}[a x]-\text{ArcTan}[a x]^2+\text{ArcTan}[a x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}+$$

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

$$\left.\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}\right)+$$

$$\frac{1}{a^3}2c^2\left(\frac{\sqrt{c\left(1+a^2x^2\right)}\left(50-19\,\text{ArcTan}[a x]^2\right)}{240\sqrt{1+a^2x^2}}+\frac{1}{120\sqrt{1+a^2x^2}}19\sqrt{c\left(1+a^2x^2\right)}\right.$$

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

$$\frac{1}{16\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]+\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.\right.$$

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

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+2i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.$$

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

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

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

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

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

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

$$\pi\left(\frac{1}{3}\,\mathrm{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{Log}\left[1+e^{2\,\mathrm{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\mathrm{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-5\,\text{ArcTan}[a\,x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2-52\,\text{ArcTan}[a\,x]+26\,\text{ArcTan}[a\,x]^2+15\,\text{ArcTan}[a\,x]^3\right)}{480\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2+5\,\text{ArcTan}[a\,x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2+52\,\text{ArcTan}[a\,x]+26\,\text{ArcTan}[a\,x]^2-15\,\text{ArcTan}[a\,x]^3\right)}{480\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-19\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{240\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-13\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{120\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+13\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}{120\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3}+$$

$$\left.\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+19\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}{240\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}\right)+$$

$$\frac{1}{a^3}c^2\left(\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-567+89\,\text{ArcTan}[a x]^2\right)}{3360\sqrt{1+a^2x^2}}-\frac{1}{1680\sqrt{1+a^2x^2}}89\sqrt{c\left(1+a^2x^2\right)}\right.$$

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

$$\frac{1}{128\sqrt{1+a^2x^2}}5\sqrt{c\left(1+a^2x^2\right)}\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]+\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right.\right.$$

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

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

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

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

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

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

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

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

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

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^3}{128\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^8}+\frac{\sqrt{c\left(1+a^2x^2\right)}\left(6\,\text{ArcTan}[a x]-9\,\text{ArcTan}[a x]^2-98\,\text{ArcTan}[a x]^3\right)}{2688\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^6}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-4-178\,\text{ArcTan}[a\,x]+178\,\text{ArcTan}[a\,x]^2+525\,\text{ArcTan}[a\,x]^3\right)}{8960\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(170+2438\,\text{ArcTan}[a\,x]-1219\,\text{ArcTan}[a\,x]^2-525\,\text{ArcTan}[a\,x]^3\right)}{26\,880\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{3\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{448\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^7}-$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^3}{128\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^8}+$$

$$\frac{3\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{448\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^7}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-6\,\text{ArcTan}[a\,x]-9\,\text{ArcTan}[a\,x]^2+98\,\text{ArcTan}[a\,x]^3\right)}{2688\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-4+178\,\text{ArcTan}[a\,x]+178\,\text{ArcTan}[a\,x]^2-525\,\text{ArcTan}[a\,x]^3\right)}{8960\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(170-2438\,\text{ArcTan}[a\,x]-1219\,\text{ArcTan}[a\,x]^2+525\,\text{ArcTan}[a\,x]^3\right)}{26\,880\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(170\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-1219\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{13\,440\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-89\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{2240\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(567\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-89\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{3360\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-567\,\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+89\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right)}{3360\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right)}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-2\,\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+89\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right)}{2240\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right)^5}+$$

$$\left.\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-170\,\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+1219\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right)}{13440\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right)^3}\right)$$

Problem 430: Result more than twice size of optimal antiderivative.

$$\int x\,(c+a^2c\,x^2)^{5/2}\,\text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 561 leaves, 22 steps):

$$-\frac{17\,c^2x\,\sqrt{c+a^2c\,x^2}}{420\,a}-\frac{c\,x\,(c+a^2c\,x^2)^{3/2}}{140\,a}+\frac{15\,c^2\,\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]}{56\,a^2}+\frac{5\,c\,(c+a^2c\,x^2)^{3/2}\,\text{ArcTan}[a\,x]}{84\,a^2}+$$

$$\frac{(c+a^2c\,x^2)^{5/2}\,\text{ArcTan}[a\,x]}{35\,a^2}-\frac{15\,c^2x\,\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^2}{112\,a}-\frac{5\,c\,x\,(c+a^2c\,x^2)^{3/2}\,\text{ArcTan}[a\,x]^2}{56\,a}-\frac{x\,(c+a^2c\,x^2)^{5/2}\,\text{ArcTan}[a\,x]^2}{14\,a}+$$

$$\frac{15\,i\,c^3\,\sqrt{1+a^2x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\,\text{ArcTan}[a\,x]^2}{56\,a^2\,\sqrt{c+a^2c\,x^2}}+\frac{(c+a^2c\,x^2)^{7/2}\,\text{ArcTan}[a\,x]^3}{7\,a^2c}-\frac{37\,c^{5/2}\,\text{ArcTanh}\left[\frac{a\,\sqrt{c}\,x}{\sqrt{c+a^2c\,x^2}}\right]}{120\,a^2}-$$

$$\frac{15\,i\,c^3\,\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{56\,a^2\,\sqrt{c+a^2c\,x^2}}+\frac{15\,i\,c^3\,\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{56\,a^2\,\sqrt{c+a^2c\,x^2}}+$$

$$\frac{15\,c^3\,\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{56\,a^2\,\sqrt{c+a^2c\,x^2}}-\frac{15\,c^3\,\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{56\,a^2\,\sqrt{c+a^2c\,x^2}}$$

Result (type 4, 1871 leaves):

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

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

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

$$\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[-\mathrm{Cos}\left[\frac{1}{4}\left(\pi+2\,\mathrm{ArcTan}[a x]\right)\right]\right]+2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]\right]-$$

$$\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]\right]-2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]\right]+$$

$$\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]\right]+\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{4}\left(\pi+2\,\mathrm{ArcTan}[a x]\right)\right]\right]-2\,i\,\mathrm{ArcTan}[a x]$$

$$\left.\mathrm{PolyLog}\left[2,-i\,e^{i\,\mathrm{ArcTan}[a x]}\right]+2\,i\,\mathrm{ArcTan}[a x]\,\mathrm{PolyLog}\left[2,i\,e^{i\,\mathrm{ArcTan}[a x]}\right]+2\,\mathrm{PolyLog}\left[3,-i\,e^{i\,\mathrm{ArcTan}[a x]}\right]-2\,\mathrm{PolyLog}\left[3,i\,e^{i\,\mathrm{ArcTan}[a x]}\right]\right)+$$

$$\frac{1}{12}\left(1+a^2x^2\right)\sqrt{c\left(1+a^2x^2\right)}\,\mathrm{ArcTan}[a x]\left(6+4\,\mathrm{ArcTan}[a x]^2+6\,\mathrm{Cos}[2\,\mathrm{ArcTan}[a x]]-3\,\mathrm{ArcTan}[a x]\,\mathrm{Sin}[2\,\mathrm{ArcTan}[a x]]\right)+$$

$$\frac{1}{a^2}2\,c^2\left(-\frac{1}{40\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\,\left(11\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}[2]-11\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a x]}\right]+\right.\right.$$

$$11\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a x]}\right]-11\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\mathrm{ArcTan}[a x]}\left(-i+e^{i\,\mathrm{ArcTan}[a x]}\right)\right]+$$

$$11\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\mathrm{ArcTan}[a x]}\left(-i+e^{i\,\mathrm{ArcTan}[a x]}\right)\right]-11\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\mathrm{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\mathrm{ArcTan}[a x]}\right)\right]-$$

$$11\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\mathrm{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\mathrm{ArcTan}[a x]}\right)\right]+11\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[-\mathrm{Cos}\left[\frac{1}{4}\left(\pi+2\,\mathrm{ArcTan}[a x]\right)\right]\right]+$$

$$20\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]\right]-11\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]\right]-$$

$$20\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]\right]+11\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a x]\right]\right]+$$

$$11\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{4}\left(\pi+2\,\mathrm{ArcTan}[a x]\right)\right]\right]-22\,i\,\mathrm{ArcTan}[a x]\,\mathrm{PolyLog}\left[2,-i\,e^{i\,\mathrm{ArcTan}[a x]}\right]+$$

$$\left.22\,i\,\mathrm{ArcTan}[a x]\,\mathrm{PolyLog}\left[2,i\,e^{i\,\mathrm{ArcTan}[a x]}\right]+22\,\mathrm{PolyLog}\left[3,-i\,e^{i\,\mathrm{ArcTan}[a x]}\right]-22\,\mathrm{PolyLog}\left[3,i\,e^{i\,\mathrm{ArcTan}[a x]}\right]\right)-$$

$$\frac{1}{960}\left(1+a^2x^2\right)^2\sqrt{c\left(1+a^2x^2\right)}\,\left(150\,\mathrm{ArcTan}[a x]-32\,\mathrm{ArcTan}[a x]^3+8\,\mathrm{ArcTan}[a x]\left(27+20\,\mathrm{ArcTan}[a x]^2\right)\mathrm{Cos}[2\,\mathrm{ArcTan}[a x]]+\right.$$

$$66\,\mathrm{ArcTan}[a x]\,\mathrm{Cos}[4\,\mathrm{ArcTan}[a x]]+12\,\mathrm{Sin}[2\,\mathrm{ArcTan}[a x]]+6\,\mathrm{ArcTan}[a x]^2\,\mathrm{Sin}[2\,\mathrm{ArcTan}[a x]]+$$

$$\left.\left.6\,\mathrm{Sin}[4\,\mathrm{ArcTan}[a x]]-33\,\mathrm{ArcTan}[a x]^2\,\mathrm{Sin}[4\,\mathrm{ArcTan}[a x]]\right)\right)+$$

$$\frac{1}{a^2}c^2\left(\frac{1}{1680\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\,\left(309\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}[2]-309\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a x]}\right]+\right.\right.$$

$$309\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a x]}\right]-309\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\mathrm{ArcTan}[a x]}\left(-i+e^{i\,\mathrm{ArcTan}[a x]}\right)\right]+$$

$$309\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\mathrm{ArcTan}[a x]}\left(-i+e^{i\,\mathrm{ArcTan}[a x]}\right)\right]-309\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\mathrm{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\mathrm{ArcTan}[a x]}\right)\right]-$$

$$309\,\mathrm{ArcTan}[a x]^2\,\mathrm{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\mathrm{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\mathrm{ArcTan}[a x]}\right)\right]+309\,\pi\,\mathrm{ArcTan}[a x]\,\mathrm{Log}\left[-\mathrm{Cos}\left[\frac{1}{4}\left(\pi+2\,\mathrm{ArcTan}[a x]\right)\right]\right]+$$

$518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]-309\,\text{ArcTan}[a x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]-$

$518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]+309\,\text{ArcTan}[a x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]+$

$309\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}(\pi+2\,\text{ArcTan}[a x])\right]\right]-618\,i\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a x]}\right]+$

$618\,i\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a x]}\right]+618\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a x]}\right]-618\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a x]}\right]\Big)-$

$\frac{1}{53760}(1+a^2x^2)^3\sqrt{c(1+a^2x^2)}\,\Big(-4116\,\text{ArcTan}[a x]-3648\,\text{ArcTan}[a x]^3+2\,\text{ArcTan}[a x]\left(-3131+896\,\text{ArcTan}[a x]^2\right)\text{Cos}[2\,\text{ArcTan}[a x]]-$

$4\,\text{ArcTan}[a x]\left(691+560\,\text{ArcTan}[a x]^2\right)\text{Cos}[4\,\text{ArcTan}[a x]]-618\,\text{ArcTan}[a x]\,\text{Cos}[6\,\text{ArcTan}[a x]]-$

$404\,\text{Sin}[2\,\text{ArcTan}[a x]]+633\,\text{ArcTan}[a x]^2\,\text{Sin}[2\,\text{ArcTan}[a x]]-352\,\text{Sin}[4\,\text{ArcTan}[a x]]-$

$180\,\text{ArcTan}[a x]^2\,\text{Sin}[4\,\text{ArcTan}[a x]]-100\,\text{Sin}[6\,\text{ArcTan}[a x]]+309\,\text{ArcTan}[a x]^2\,\text{Sin}[6\,\text{ArcTan}[a x]]\Big)$

Problem 431: Result more than twice size of optimal antiderivative.

$$\int (c+a^2 c x^2)^{5/2}\,\text{ArcTan}[a x]^3\,dx$$

Optimal (type 4, 870 leaves, 23 steps):

$-\frac{17 c^2\sqrt{c+a^2cx^2}}{60a}-\frac{c(c+a^2cx^2)^{3/2}}{60a}+\frac{17}{60}c^2x\sqrt{c+a^2cx^2}\,\text{ArcTan}[a x]+\frac{1}{20}cx(c+a^2cx^2)^{3/2}\text{ArcTan}[a x]-\frac{15c^2\sqrt{c+a^2cx^2}\,\text{ArcTan}[a x]^2}{16a}-$

$\frac{5c(c+a^2cx^2)^{3/2}\text{ArcTan}[a x]^2}{24a}-\frac{(c+a^2cx^2)^{5/2}\text{ArcTan}[a x]^2}{10a}+\frac{5}{16}c^2x\sqrt{c+a^2cx^2}\,\text{ArcTan}[a x]^3+\frac{5}{24}cx(c+a^2cx^2)^{3/2}\text{ArcTan}[a x]^3+$

$\frac{1}{6}x(c+a^2cx^2)^{5/2}\text{ArcTan}[a x]^3-\frac{5\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a x]}\right]\text{ArcTan}[a x]^3}{8a\sqrt{c+a^2cx^2}}-\frac{259\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{60a\sqrt{c+a^2cx^2}}+$

$\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]^2\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a x]}\right]}{16a\sqrt{c+a^2cx^2}}-\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]^2\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a x]}\right]}{16a\sqrt{c+a^2cx^2}}+$

$\frac{259\,i\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[2,-\frac{i\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{120a\sqrt{c+a^2cx^2}}-\frac{259\,i\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[2,\frac{i\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{120a\sqrt{c+a^2cx^2}}-$

$\frac{15c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a x]}\right]}{8a\sqrt{c+a^2cx^2}}+\frac{15c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a x]}\right]}{8a\sqrt{c+a^2cx^2}}-$

$\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[4,-i\,e^{i\,\text{ArcTan}[a x]}\right]}{8a\sqrt{c+a^2cx^2}}+\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[4,i\,e^{i\,\text{ArcTan}[a x]}\right]}{8a\sqrt{c+a^2cx^2}}$

Result (type 4, 5547 leaves) :

$$\frac{1}{a} c^2 \Bigg(-\frac{3\sqrt{c\,(1+a^2 x^2)}\;\text{ArcTan}[a\,x]^2}{2\sqrt{1+a^2 x^2}} + \frac{1}{\sqrt{1+a^2 x^2}} 3\sqrt{c\,(1+a^2 x^2)}$$

$$\Big(\text{ArcTan}[a\,x]\,\Big(\text{Log}\big[1-\mathrm{i}\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] - \text{Log}\big[1+\mathrm{i}\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big]\Big) + \mathrm{i}\,\Big(\text{PolyLog}\big[2,\,-\mathrm{i}\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big] - \text{PolyLog}\big[2,\,\mathrm{i}\,\mathrm{e}^{\mathrm{i}\,\text{ArcTan}[a\,x]}\big]\Big)\Big) +$$

$$\frac{1}{2\sqrt{1+a^2 x^2}} \sqrt{c\,(1+a^2 x^2)}\;\Bigg(\frac{1}{8}\pi^3\,\text{Log}\Big[\text{Cot}\Big[\frac{1}{2}\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)\Big]\Big] + \frac{3}{4}\pi^2\,\Bigg(\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)$$

$$\Big(\text{Log}\big[1-\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] - \text{Log}\big[1+\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big]\Big) + \mathrm{i}\,\Big(\text{PolyLog}\big[2,\,-\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] - \text{PolyLog}\big[2,\,\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big]\Big)\Bigg) -$$

$$\frac{3}{2}\pi\,\Bigg(\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)^2\,\Big(\text{Log}\big[1-\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] - \text{Log}\big[1+\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big]\Big) + 2\,\mathrm{i}\,\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)$$

$$\Big(\text{PolyLog}\big[2,\,-\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] - \text{PolyLog}\big[2,\,\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big]\Big) + 2\,\Big(-\text{PolyLog}\big[3,\,-\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] + \text{PolyLog}\big[3,\,\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big]\Big)\Bigg) +$$

$$8\,\Bigg(\frac{1}{64}\,\mathrm{i}\,\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)^4 + \frac{1}{4}\,\mathrm{i}\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^4 - \frac{1}{8}\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)^3\,\text{Log}\big[1+\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] -$$

$$\frac{1}{8}\pi^3\,\Big(\mathrm{i}\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big) - \text{Log}\big[1+\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big]\Big) - \Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^3$$

$$\text{Log}\big[1+\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big] + \frac{3}{8}\,\mathrm{i}\,\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)^2\,\text{PolyLog}\big[2,\,-\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] + \frac{3}{4}\pi^2\,\Bigg(\frac{1}{2}\,\mathrm{i}\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^2 -$$

$$\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)\,\text{Log}\big[1+\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big] + \frac{1}{2}\,\mathrm{i}\,\text{PolyLog}\big[2,\,-\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big]\Bigg) +$$

$$\frac{3}{2}\,\mathrm{i}\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^2\,\text{PolyLog}\big[2,\,-\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big] - \frac{3}{4}\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)\,\text{PolyLog}\big[3,\,-\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] - \frac{3}{2}$$

$$\pi\,\Bigg(\frac{1}{3}\,\mathrm{i}\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^3 - \Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^2\,\text{Log}\big[1+\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big] + \mathrm{i}\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)$$

$$\text{PolyLog}\big[2,\,-\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big] - \frac{1}{2}\,\text{PolyLog}\big[3,\,-\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big]\Bigg) - \frac{3}{2}\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)$$

$$\text{PolyLog}\big[3,\,-\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big] - \frac{3}{4}\,\mathrm{i}\,\text{PolyLog}\big[4,\,-\mathrm{e}^{\mathrm{i}\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}\big] - \frac{3}{4}\,\mathrm{i}\,\text{PolyLog}\big[4,\,-\mathrm{e}^{2\,\mathrm{i}\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}\big]\Bigg)\Bigg) +$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\;\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2 x^2}\,\big(\text{Cos}\big[\frac{1}{2}\text{ArcTan}[a\,x]\big] - \text{Sin}\big[\frac{1}{2}\text{ArcTan}[a\,x]\big]\big)^2} - \frac{3\sqrt{c\,(1+a^2 x^2)}\;\text{ArcTan}[a\,x]^2\,\text{Sin}\big[\frac{1}{2}\text{ArcTan}[a\,x]\big]}{2\sqrt{1+a^2 x^2}\,\big(\text{Cos}\big[\frac{1}{2}\text{ArcTan}[a\,x]\big] - \text{Sin}\big[\frac{1}{2}\text{ArcTan}[a\,x]\big]\big)} -$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\;\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2 x^2}\,\big(\text{Cos}\big[\frac{1}{2}\text{ArcTan}[a\,x]\big] + \text{Sin}\big[\frac{1}{2}\text{ArcTan}[a\,x]\big]\big)^2} +$$

$$\frac{3\sqrt{c\,(1+a^2x^2)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]]}{2\sqrt{1+a^2x^2}\ (\text{Cos}[\frac{1}{2}\text{ArcTan}[a\,x]]+\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]])}\Bigg)+$$

$$\frac{1}{a}2\,c^2\Bigg(\frac{\sqrt{c\,(1+a^2x^2)}\ (-1+\text{ArcTan}[a\,x]^2)}{4\sqrt{1+a^2x^2}}+\frac{1}{2\sqrt{1+a^2x^2}}$$

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

$$(-\text{ArcTan}[a\,x]\ (\text{Log}[1-i\,e^{i\,\text{ArcTan}[a\,x]}]-\text{Log}[1+i\,e^{i\,\text{ArcTan}[a\,x]}])-i\,(\text{PolyLog}[2,-i\,e^{i\,\text{ArcTan}[a\,x]}]-\text{PolyLog}[2,i\,e^{i\,\text{ArcTan}[a\,x]}]))+$$

$$\frac{1}{8\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\ \Bigg(-\frac{1}{8}\pi^3\,\text{Log}[\text{Cot}[\frac{1}{2}(\frac{\pi}{2}-\text{ArcTan}[a\,x])]]-\frac{3}{4}\pi^2\,((\frac{\pi}{2}-\text{ArcTan}[a\,x])$$

$$(\text{Log}[1-e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\text{Log}[1+e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}])+i\,(\text{PolyLog}[2,-e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\text{PolyLog}[2,e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]))+$$

$$\frac{3}{2}\pi\,((\frac{\pi}{2}-\text{ArcTan}[a\,x])^2\,(\text{Log}[1-e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\text{Log}[1+e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}])+2\,i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])$$

$$(\text{PolyLog}[2,-e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\text{PolyLog}[2,e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}])+2\,(-\text{PolyLog}[3,-e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]+\text{PolyLog}[3,e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]))-$$

$$8\,\Bigg(\frac{1}{64}i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])^4+\frac{1}{4}i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))^4-\frac{1}{8}(\frac{\pi}{2}-\text{ArcTan}[a\,x])^3\,\text{Log}[1+e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-$$

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

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

$$(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))\ \text{Log}[1+e^{2\,i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]+\frac{1}{2}i\,\text{PolyLog}[2,-e^{2\,i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}])+$$

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

$$\pi\,(\frac{1}{3}i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))^3-(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))^2\,\text{Log}[1+e^{2\,i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]+i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))$$

$$\text{PolyLog}[2,-e^{2\,i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]-\frac{1}{2}\text{PolyLog}[3,-e^{2\,i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}])-\frac{3}{2}(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))$$

$$\text{PolyLog}[3,-e^{2\,i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]-\frac{3}{4}i\,\text{PolyLog}[4,-e^{i\,(\frac{\pi}{2}-\text{ArcTan}[a\,x])}]-\frac{3}{4}i\,\text{PolyLog}[4,-e^{2\,i\,(\frac{\pi}{2}+\frac{1}{2}(-\frac{\pi}{2}+\text{ArcTan}[a\,x]))}]\Bigg)\Bigg)+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\ \text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\ (\text{Cos}[\frac{1}{2}\text{ArcTan}[a\,x]]-\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]])^4}+\frac{\sqrt{c\,(1+a^2x^2)}\ (2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-\text{ArcTan}[a\,x]^3)}{16\sqrt{1+a^2x^2}\ (\text{Cos}[\frac{1}{2}\text{ArcTan}[a\,x]]-\text{Sin}[\frac{1}{2}\text{ArcTan}[a\,x]])^2}-$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\ \mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\ \mathrm{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\ \mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\ \left(-2\,\mathrm{ArcTan}[a\,x]-\mathrm{ArcTan}[a\,x]^2+\mathrm{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^2}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\ \left(\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}{4\sqrt{1+a^2x^2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}+$$

$$\left.\frac{\sqrt{c\,(1+a^2x^2)}\ \left(-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{ArcTan}[a\,x]^2\,\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}{4\sqrt{1+a^2x^2}\,\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]-\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}\right)+$$

$$\frac{1}{a}c^2\left(\frac{\sqrt{c\,(1+a^2x^2)}\ \left(50-19\,\mathrm{ArcTan}[a\,x]^2\right)}{240\sqrt{1+a^2x^2}}+\frac{1}{120\sqrt{1+a^2x^2}}\right.$$

$$19\sqrt{c\,(1+a^2x^2)}$$

$$\left(\mathrm{ArcTan}[a\,x]\left(\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]\right)+i\left(\mathrm{PolyLog}\left[2,-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\mathrm{PolyLog}\left[2,i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]\right)\right)+$$

$$\frac{1}{16\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\ \left(\frac{1}{8}\pi^3\,\mathrm{Log}\left[\mathrm{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)\right]\right]+\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)\right.\right.$$

$$\left.\left(\mathrm{Log}\left[1-e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]-\mathrm{Log}\left[1+e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]\right)+i\left(\mathrm{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]-\mathrm{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]\right)\right)-$$

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)^2\left(\mathrm{Log}\left[1-e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]-\mathrm{Log}\left[1+e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]\right)+2\,i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)\right.$$

$$\left.\left(\mathrm{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]-\mathrm{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]\right)+2\left(-\mathrm{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]+\mathrm{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\mathrm{ArcTan}[a\,x]\right)}\right]\right)\right)+$$

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

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

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

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

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

$$\pi \left(\frac{1}{3} i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2 \text{Log}\left[1+e^{2 i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+i \left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\right.$$

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

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

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^3}{48 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^6}+\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(\text{ArcTan}[a x]-\text{ArcTan}[a x]^2-5\, \text{ArcTan}[a x]^3\right)}{80 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(-2-52\, \text{ArcTan}[a x]+26\, \text{ArcTan}[a x]^2+15\, \text{ArcTan}[a x]^3\right)}{480 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^2\, \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{40 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^5}-$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^3}{48 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^6}+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^2\, \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{40 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^5}+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(-\text{ArcTan}[a x]-\text{ArcTan}[a x]^2+5\, \text{ArcTan}[a x]^3\right)}{80 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(-2+52\, \text{ArcTan}[a x]+26\, \text{ArcTan}[a x]^2-15\, \text{ArcTan}[a x]^3\right)}{480 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^2}+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(50\, \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-19\, \text{ArcTan}[a x]^2\, \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)}{240 \sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-13\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{120\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+13\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{120\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\left.\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+19\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{240\,\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 432: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 845 leaves, 54 steps):

$$-\frac{1}{20}a\,c^2x\,\sqrt{c+a^2c\,x^2}+\frac{29}{20}c^2\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]+\frac{1}{10}c\,(c+a^2c\,x^2)^{3/2}\,\text{ArcTan}[a\,x]-\frac{29}{40}a\,c^2x\,\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^2-$$

$$\frac{3}{20}a\,c\,x\,(c+a^2c\,x^2)^{3/2}\,\text{ArcTan}[a\,x]^2+\frac{149\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\,\text{ArcTan}[a\,x]^2}{20\sqrt{c+a^2c\,x^2}}+c^2\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^3+$$

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

$$\frac{3}{2}c^{5/2}\,\text{ArcTanh}\left[\frac{a\sqrt{c}\,x}{\sqrt{c+a^2c\,x^2}}\right]+\frac{3\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{c+a^2c\,x^2}}-$$

$$\frac{149\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{20\sqrt{c+a^2c\,x^2}}+\frac{149\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{20\sqrt{c+a^2c\,x^2}}-$$

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

$$\frac{149\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{20\sqrt{c+a^2c\,x^2}}-\frac{149\,c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{20\sqrt{c+a^2c\,x^2}}+$$

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

Result (type 4, 1739 leaves):

$$\frac{1}{8} c^2 \sqrt{c\,(1+a^2 x^2)}$$

$$\left(-\frac{i\pi^4}{\sqrt{1+a^2x^2}} + 8\,\text{ArcTan}[a\,x]^3 + \frac{2\,i\,\text{ArcTan}[a\,x]^4}{\sqrt{1+a^2x^2}} + \frac{8\,\text{ArcTan}[a\,x]^3\,\text{Log}\left[1-e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} - \frac{24\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} + \right.$$

$$\frac{24\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} - \frac{8\,\text{ArcTan}[a\,x]^3\,\text{Log}\left[1+e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} + \frac{24\,i\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} +$$

$$\frac{24\,i\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,\,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} - \frac{48\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} + \frac{48\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} +$$

$$\frac{48\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} - \frac{48\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,\,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} + \frac{48\,\text{PolyLog}\left[3,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} -$$

$$\left.\frac{48\,\text{PolyLog}\left[3,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} - \frac{48\,i\,\text{PolyLog}\left[4,\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}} - \frac{48\,i\,\text{PolyLog}\left[4,\,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}\right) +$$

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

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

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

$$\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}(\pi+2\,\text{ArcTan}[a\,x])\right]\right] + 2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right] - \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right] -$$

$$\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right] - \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right] - 2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right] + \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right] +$$

$$\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right] + \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right] + \pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}(\pi+2\,\text{ArcTan}[a\,x])\right]\right] - 2\,i\,\text{ArcTan}[a\,x]$$

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

$$\left.\frac{1}{12}(1+a^2x^2)\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]\,\left(6+4\,\text{ArcTan}[a\,x]^2+6\,\text{Cos}[2\,\text{ArcTan}[a\,x]]-3\,\text{ArcTan}[a\,x]\,\text{Sin}[2\,\text{ArcTan}[a\,x]]\right)\right) +$$

$$c^2\left(-\frac{1}{40\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\left(11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2] - 11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right] + \right.\right.$$

$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right] - 11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right] +$$

$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right] - 11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right] -$$

$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right] + 11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}(\pi+2\,\text{ArcTan}[a\,x])\right]\right] +$$

$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-$$
$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$$
$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\,(\pi+2\,\text{ArcTan}[a\,x])\right]\right]-22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+22\,\text{PolyLog}\left[3,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-22\,\text{PolyLog}\left[3,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Bigg)-$$
$$\frac{1}{960}\,\left(1+a^2\,x^2\right)^2\,\sqrt{c\,\left(1+a^2\,x^2\right)}\,\left(150\,\text{ArcTan}[a\,x]-32\,\text{ArcTan}[a\,x]^3+8\,\text{ArcTan}[a\,x]\,\left(27+20\,\text{ArcTan}[a\,x]^2\right)\,\text{Cos}[2\,\text{ArcTan}[a\,x]]+\right.$$
$$66\,\text{ArcTan}[a\,x]\,\text{Cos}[4\,\text{ArcTan}[a\,x]]+12\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+$$
$$\left.6\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-33\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]\right)\Bigg)$$

Problem 433: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 1027 leaves, 56 steps) :

$$-\frac{1}{4} a c^2 \sqrt{c+a^2 c x^2}+\frac{1}{4} a^2 c^2 x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]-\frac{21}{8} a c^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2-$$
$$\frac{1}{4} a c \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^2-\frac{c^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3}{x}+\frac{7}{8} a^2 c^2 x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3+$$
$$\frac{1}{4} a^2 c x \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^3-\frac{15 i a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^3}{4 \sqrt{c+a^2 c x^2}}-$$
$$\frac{11 i a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-\frac{6 a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2 \text{ArcTanh}\left[e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{6 i a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[2,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{45 i a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{8 \sqrt{c+a^2 c x^2}}-$$
$$\frac{45 i a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{8 \sqrt{c+a^2 c x^2}}-\frac{6 i a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[2,e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{11 i a c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{2 \sqrt{c+a^2 c x^2}}-\frac{11 i a c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{2 \sqrt{c+a^2 c x^2}}-\frac{6 a c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[3,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{45 a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{4 \sqrt{c+a^2 c x^2}}+\frac{45 a c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{4 \sqrt{c+a^2 c x^2}}+$$
$$\frac{6 a c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[3,e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{45 i a c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,-i e^{i \text{ArcTan}[a x]}\right]}{4 \sqrt{c+a^2 c x^2}}+\frac{45 i a c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,i e^{i \text{ArcTan}[a x]}\right]}{4 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 4536 leaves):

$$\frac{1}{128 \sqrt{1+a^2 x^2}} a c^2 \sqrt{c \left(1+a^2 x^2\right)}\ \text{Csc}\left[\frac{1}{2} \text{ArcTan}[a x]\right]$$
$$\left(-\frac{7 i a \pi^4 x}{\sqrt{1+a^2 x^2}}-\frac{8 i a \pi^3 x\, \text{ArcTan}[a x]}{\sqrt{1+a^2 x^2}}+\frac{24 i a \pi^2 x\, \text{ArcTan}[a x]^2}{\sqrt{1+a^2 x^2}}-64\, \text{ArcTan}[a x]^3-\frac{32 i a \pi x\, \text{ArcTan}[a x]^3}{\sqrt{1+a^2 x^2}}+\frac{16 i a x\, \text{ArcTan}[a x]^4}{\sqrt{1+a^2 x^2}}+\right.$$
$$\frac{48 a \pi^2 x\, \text{ArcTan}[a x]\ \text{Log}\left[1-i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{96 a \pi x\, \text{ArcTan}[a x]^2 \text{Log}\left[1-i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{8 a \pi^3 x\, \text{Log}\left[1+i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+$$
$$\frac{64 a x\, \text{ArcTan}[a x]^3 \text{Log}\left[1+i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{192 a x\, \text{ArcTan}[a x]^2 \text{Log}\left[1-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{8 a \pi^3 x\, \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-$$
$$\frac{48 a \pi^2 x\, \text{ArcTan}[a x]\ \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{96 a \pi x\, \text{ArcTan}[a x]^2 \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{64 a x\, \text{ArcTan}[a x]^3 \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-$$

$$\frac{192\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+\frac{8\,a\,\pi^3\,x\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}\,(\pi+2\,\text{ArcTan}[a\,x])\right]\right]}{\sqrt{1+a^2x^2}}+\frac{192\,i\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+$$

$$\frac{48\,i\,a\,\pi\,x\,(\pi-4\,\text{ArcTan}[a\,x])\,\text{PolyLog}\left[2,i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+\frac{384\,i\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+$$

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

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

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

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

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

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

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

$$\frac{1}{2\,\sqrt{1+a^2x^2}}\,\sqrt{c\,(1+a^2x^2)}\,\left(\frac{1}{8}\,\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]+\frac{3}{4}\,\pi^2\,\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right.\right.$$

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

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

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

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

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

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

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

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

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

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

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left.\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)+$$

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

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

$$\frac{1}{8\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(-\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]-\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right.\right.$$

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

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

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

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

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

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

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

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

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

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+\frac{\sqrt{c\left(1+a^2x^2\right)}\left(2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2+\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

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

$$\left.\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 435: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 1061 leaves, 86 steps):

$$-\frac{a^2 c^2 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]}{x}-\frac{3}{2} a^3 c^2 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2-\frac{a c^2 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2}{2 x^2}-\frac{2 a^2 c^2 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^3}{x}+$$
$$\frac{1}{2} a^4 c^2 x \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^3-\frac{c \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^3}{3 x^3}-\frac{5 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^3}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{6 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-\frac{13 a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2\, \text{ArcTanh}\left[e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-a^3 c^{5/2}\, \text{ArcTanh}\left[\frac{\sqrt{c+a^2 c x^2}}{\sqrt{c}}\right]+$$
$$\frac{13 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{15 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2\, \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{2 \sqrt{c+a^2 c x^2}}-$$
$$\frac{15 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2\, \text{PolyLog}\left[2, i e^{i \text{ArcTan}[a x]}\right]}{2 \sqrt{c+a^2 c x^2}}-\frac{13 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2, e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{3 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-\frac{3 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-\frac{13 a^3 c^3 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[3,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{15 a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{15 a^3 c^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{PolyLog}\left[3, i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{13 a^3 c^3 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[3, e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{15 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[4,-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{15 i a^3 c^3 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[4, i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}$$

Result (type 4, 3037 leaves):

$$\frac{1}{64 \sqrt{1+a^2 x^2}} a^3 c^2 \sqrt{c \left(1+a^2 x^2\right)}\, \text{Csc}\left[\frac{1}{2} \text{ArcTan}[a x]\right]$$
$$\left(-\frac{7 i a \pi^4 x}{\sqrt{1+a^2 x^2}}-\frac{8 i a \pi^3 x\, \text{ArcTan}[a x]}{\sqrt{1+a^2 x^2}}+\frac{24 i a \pi^2 x\, \text{ArcTan}[a x]^2}{\sqrt{1+a^2 x^2}}-64\, \text{ArcTan}[a x]^3-\frac{32 i a \pi x\, \text{ArcTan}[a x]^3}{\sqrt{1+a^2 x^2}}+\frac{16 i a x\, \text{ArcTan}[a x]^4}{\sqrt{1+a^2 x^2}}+\right.$$
$$\frac{48 a \pi^2 x\, \text{ArcTan}[a x]\, \text{Log}\left[1-i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{96 a \pi x\, \text{ArcTan}[a x]^2\, \text{Log}\left[1-i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{8 a \pi^3 x\, \text{Log}\left[1+i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+$$
$$\frac{64 a x\, \text{ArcTan}[a x]^3\, \text{Log}\left[1+i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{192 a x\, \text{ArcTan}[a x]^2\, \text{Log}\left[1-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{8 a \pi^3 x\, \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-$$
$$\frac{48 a \pi^2 x\, \text{ArcTan}[a x]\, \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{96 a \pi x\, \text{ArcTan}[a x]^2\, \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{64 a x\, \text{ArcTan}[a x]^3\, \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-$$
$$\frac{192 a x\, \text{ArcTan}[a x]^2\, \text{Log}\left[1+e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{8 a \pi^3 x\, \text{Log}\left[\text{Tan}\left[\frac{1}{4} \left(\pi+2\, \text{ArcTan}[a x]\right)\right]\right]}{\sqrt{1+a^2 x^2}}+\frac{192 i a x\, \text{ArcTan}[a x]^2\, \text{PolyLog}\left[2,-i e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+$$

$$\frac{48\,i\,a\,\pi\,x\,(\pi-4\,\text{ArcTan}[a\,x])\,\text{PolyLog}\left[2,\,i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+\frac{384\,i\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,\,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+$$

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

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

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

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

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

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

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

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]+\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right.\right.$$

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

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

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

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

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

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

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

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

$$\frac{3}{2}\pi\left(\frac{1}{3}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\right.$$

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

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}+$$

$$\left.\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}\right)+$$

$$\frac{1}{24\sqrt{c\left(1+a^2x^2\right)}}a^3c^3\sqrt{1+a^2x^2}\left(-12\,\text{ArcTan}[a x]\,\text{Cot}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-2\,\text{ArcTan}[a x]^3\,\text{Cot}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\right.$$

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

$$12\,\text{ArcTan}[a x]^2\,\text{Log}\left[1-e^{i\,\text{ArcTan}[a x]}\right]-12\,\text{ArcTan}[a x]^2\,\text{Log}\left[1+e^{i\,\text{ArcTan}[a x]}\right]+$$

$$24\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]+24\,i\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,-e^{i\,\text{ArcTan}[a x]}\right]-$$

$$24\,i\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,e^{i\,\text{ArcTan}[a x]}\right]-24\,\text{PolyLog}\left[3,-e^{i\,\text{ArcTan}[a x]}\right]+24\,\text{PolyLog}\left[3,e^{i\,\text{ArcTan}[a x]}\right]+$$

$$3\,\text{ArcTan}[a x]^2\,\text{Sec}\left[\frac{1}{2}\text{ArcTan}[a x]\right]^2-\frac{8\left(1+a^2x^2\right)^{3/2}\text{ArcTan}[a x]^3\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]^4}{a^3x^3}-$$

$$\left.12\,\text{ArcTan}[a x]\,\text{Tan}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-2\,\text{ArcTan}[a x]^3\,\text{Tan}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)$$

Problem 437: Result more than twice size of optimal antiderivative.

$$\int\frac{x^2\,\text{ArcTan}[a x]^3}{\sqrt{c+a^2c x^2}}\,dx$$

Optimal (type 4, 625 leaves, 15 steps):

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

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

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

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

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

Result (type 4, 1527 leaves) :

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

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

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\ \left(-\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]-\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right.\right.$$

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

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\left(\text{Log}\left[1-e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+2\,\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right.$$

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

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

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

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

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

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

$$\frac{3}{2}\pi\left(\frac{1}{3}\mathrm{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{Log}\left[1+e^{2\mathrm{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\mathrm{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$

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

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

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

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\ \left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left.\frac{3\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\ \left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 509: Attempted integration timed out after 120 seconds.

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

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

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

Result (type 1, 1 leaves):

???

Problem 515: Attempted integration timed out after 120 seconds.

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

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

$$\text{Unintegrable}\left[\frac{x^4}{\left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 1171: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 893 leaves, 23 steps):

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

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

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

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

Result (type 4, 1922 leaves):

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

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

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

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

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

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

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

$$\frac{1}{32\, c^4\, d^2\, (c^2\, d - e)\, \sqrt{-c^2\, d\, e}}\, 3\, e\, \Bigg(4\, \text{ArcTan}[c\, x]\, \text{ArcTanh}\Big[\frac{c\, d}{\sqrt{-c^2\, d\, e}\, x}\Big] + 2\, \text{ArcCos}\Big[-\frac{c^2\, d + e}{c^2\, d - e}\Big]\, \text{ArcTanh}\Big[\frac{c\, e\, x}{\sqrt{-c^2\, d\, e}}\Big] -$$

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

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

$$\Big(\text{ArcCos}\Big[-\frac{c^2\, d + e}{c^2\, d - e}\Big] - 2\, i\, \Big(\text{ArcTanh}\Big[\frac{c\, d}{\sqrt{-c^2\, d\, e}\, x}\Big] + \text{ArcTanh}\Big[\frac{c\, e\, x}{\sqrt{-c^2\, d\, e}}\Big]\Big)\Big)\, \text{Log}\Big[\frac{\sqrt{2}\, \sqrt{-c^2\, d\, e}\, e^{-i\, \text{ArcTan}[c\, x]}}{\sqrt{c^2\, d - e}\, \sqrt{c^2\, d + e + (c^2\, d - e)\, \text{Cos}[2\, \text{ArcTan}[c\, x]]}}\Big] +$$

$$\Big(\text{ArcCos}\Big[-\frac{c^2\, d + e}{c^2\, d - e}\Big] + 2\, i\, \Big(\text{ArcTanh}\Big[\frac{c\, d}{\sqrt{-c^2\, d\, e}\, x}\Big] + \text{ArcTanh}\Big[\frac{c\, e\, x}{\sqrt{-c^2\, d\, e}}\Big]\Big)\Big)\, \text{Log}\Big[\frac{\sqrt{2}\, \sqrt{-c^2\, d\, e}\, e^{i\, \text{ArcTan}[c\, x]}}{\sqrt{c^2\, d - e}\, \sqrt{c^2\, d + e + (c^2\, d - e)\, \text{Cos}[2\, \text{ArcTan}[c\, x]]}}\Big] +$$

$$i\, \Big(\text{PolyLog}\Big[2, \frac{\big(c^2\, d + e - 2\, i\, \sqrt{-c^2\, d\, e}\big)\, \big(2\, c^2\, d - 2\, c\, \sqrt{-c^2\, d\, e}\, x\big)}{(c^2\, d - e)\, \big(2\, c^2\, d + 2\, c\, \sqrt{-c^2\, d\, e}\, x\big)}\Big] - \text{PolyLog}\Big[2, \frac{\big(c^2\, d + e + 2\, i\, \sqrt{-c^2\, d\, e}\big)\, \big(2\, c^2\, d - 2\, c\, \sqrt{-c^2\, d\, e}\, x\big)}{(c^2\, d - e)\, \big(2\, c^2\, d + 2\, c\, \sqrt{-c^2\, d\, e}\, x\big)}\Big]\Big)\Bigg) -$$

$$\frac{e\, \text{ArcTan}[c\, x]\, \text{Sin}[2\, \text{ArcTan}[c\, x]]}{2\, c^2\, d\, (c^2\, d - e)\, (c^2\, d + e + c^2\, d\, \text{Cos}[2\, \text{ArcTan}[c\, x]] - e\, \text{Cos}[2\, \text{ArcTan}[c\, x]])^2} +$$

$$\big(2\, c^2\, d\, e + 5\, c^4\, d^2\, \text{ArcTan}[c\, x]\, \text{Sin}[2\, \text{ArcTan}[c\, x]] - 8\, c^2\, d\, e\, \text{ArcTan}[c\, x]\, \text{Sin}[2\, \text{ArcTan}[c\, x]] + 3\, e^2\, \text{ArcTan}[c\, x]\, \text{Sin}[2\, \text{ArcTan}[c\, x]]\big) \Big/$$

$$\Big(8\, c^4\, d^2\, (c^2\, d - e)^2\, (c^2\, d + e + c^2\, d\, \text{Cos}[2\, \text{ArcTan}[c\, x]] - e\, \text{Cos}[2\, \text{ArcTan}[c\, x]])\Big)\Bigg)$$

Problem 1173: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 223 leaves, 9 steps):

$$-\frac{b\, (c^2\, d - 12\, e)\, x\, \sqrt{d + e\, x^2}}{120\, c^3\, e} - \frac{b\, x\, (d + e\, x^2)^{3/2}}{20\, c\, e} - \frac{d\, (d + e\, x^2)^{3/2}\, (a + b\, \text{ArcTan}[c\, x])}{3\, e^2} +$$

$$\frac{(d + e\, x^2)^{5/2}\, (a + b\, \text{ArcTan}[c\, x])}{5\, e^2} + \frac{b\, (c^2\, d - e)^{3/2}\, (2\, c^2\, d + 3\, e)\, \text{ArcTan}\Big[\frac{\sqrt{c^2\, d - e}\, x}{\sqrt{d + e\, x^2}}\Big]}{15\, c^5\, e^2} + \frac{b\, (15\, c^4\, d^2 + 20\, c^2\, d\, e - 24\, e^2)\, \text{ArcTanh}\Big[\frac{\sqrt{e}\, x}{\sqrt{d + e\, x^2}}\Big]}{120\, c^5\, e^{3/2}}$$

Result (type 3, 391 leaves):

$$\frac{1}{120 c^5 e^2}\left(-c^2 \sqrt{d+e x^2}\left(8 a c^3\left(2 d^2-d e x^2-3 e^2 x^4\right)+b e x\left(-12 e+c^2\left(7 d+6 e x^2\right)\right)\right)-8 b c^5 \sqrt{d+e x^2}\left(2 d^2-d e x^2-3 e^2 x^4\right) \text{ArcTan}[c x]-4 i b\left(c^2 d-e\right)^{3/2}\left(2 c^2 d+3 e\right) \text{Log}\left[-\frac{60 i c^6 e^2\left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{5/2}\left(2 c^2 d+3 e\right)(i+c x)}\right]+4 i b\left(c^2 d-e\right)^{3/2}\left(2 c^2 d+3 e\right) \text{Log}\left[\frac{60 i c^6 e^2\left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{5/2}\left(2 c^2 d+3 e\right)(-i+c x)}\right]+b \sqrt{e}\left(15 c^4 d^2+20 c^2 d e-24 e^2\right) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 1175: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 140 leaves, 7 steps):

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

Result (type 3, 279 leaves):

$$\frac{1}{6 c^3 e}\left(c^2 \sqrt{d+e x^2}\left(-b e x+2 a c\left(d+e x^2\right)\right)+2 b c^3\left(d+e x^2\right)^{3/2} \text{ArcTan}[c x]-i b\left(c^2 d-e\right)^{3/2} \text{Log}\left[\frac{12 c^4 e\left(-i c d+e x-i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{5/2}(-i+c x)}\right]+i b\left(c^2 d-e\right)^{3/2} \text{Log}\left[\frac{12 c^4 e\left(i c d+e x+i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{5/2}(i+c x)}\right]+b \sqrt{e}\left(-3 c^2 d+2 e\right) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 1180: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 137 leaves, 9 steps):

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

Result (type 3, 288 leaves):

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

Problem 1182: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 224 leaves, 10 steps):

$$\frac{b\,c\,\left(12\,c^2\,d-e\right)\,\sqrt{d+e\,x^2}}{120\,d\,x^2}-\frac{b\,c\,\left(d+e\,x^2\right)^{3/2}}{20\,d\,x^4}-\frac{\left(d+e\,x^2\right)^{3/2}\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{5\,d\,x^5}+\frac{2\,e\,\left(d+e\,x^2\right)^{3/2}\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{15\,d^2\,x^3}-\frac{b\,c\,\left(24\,c^4\,d^2-20\,c^2\,d\,e-15\,e^2\right)\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{120\,d^{3/2}}+\frac{b\,\left(c^2\,d-e\right)^{3/2}\,\left(3\,c^2\,d+2\,e\right)\,\text{ArcTanh}\left[\frac{c\,\sqrt{d+e\,x^2}}{\sqrt{c^2\,d-e}}\right]}{15\,d^2}$$

Result (type 3, 413 leaves):

$$\frac{1}{120\,d^2\,x^5}\left(-\sqrt{d+e\,x^2}\,\left(8\,a\,\left(3\,d^2+d\,e\,x^2-2\,e^2\,x^4\right)+b\,c\,d\,x\,\left(7\,e\,x^2+d\,\left(6-12\,c^2\,x^2\right)\right)\right)-8\,b\,\sqrt{d+e\,x^2}\,\left(3\,d^2+d\,e\,x^2-2\,e^2\,x^4\right)\,\text{ArcTan}[c\,x]+b\,c\,\sqrt{d}\,\left(24\,c^4\,d^2-20\,c^2\,d\,e-15\,e^2\right)\,x^5\,\text{Log}[x]-b\,c\,\sqrt{d}\,\left(24\,c^4\,d^2-20\,c^2\,d\,e-15\,e^2\right)\,x^5\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]+4\,b\,\left(c^2\,d-e\right)^{3/2}\,\left(3\,c^2\,d+2\,e\right)\,x^5\,\text{Log}\left[-\frac{60\,c\,d^2\,\left(c\,d-i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^2\,d-e\right)^{5/2}\,\left(3\,c^2\,d+2\,e\right)\,\left(i+c\,x\right)}\right]+4\,b\,\left(c^2\,d-e\right)^{3/2}\,\left(3\,c^2\,d+2\,e\right)\,x^5\,\text{Log}\left[-\frac{60\,c\,d^2\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^2\,d-e\right)^{5/2}\,\left(3\,c^2\,d+2\,e\right)\,\left(-i+c\,x\right)}\right]\right)$$

Problem 1183: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 279 leaves, 10 steps):

$$\frac{b\left(3c^4d^2+54c^2de-40e^2\right)x\sqrt{d+ex^2}}{560c^5e}-\frac{b\left(13c^2d-30e\right)x\left(d+ex^2\right)^{3/2}}{840c^3e}-\frac{bx\left(d+ex^2\right)^{5/2}}{42ce}-\frac{d\left(d+ex^2\right)^{5/2}\left(a+b\,\text{ArcTan}[cx]\right)}{5e^2}+\frac{\left(d+ex^2\right)^{7/2}\left(a+b\,\text{ArcTan}[cx]\right)}{7e^2}+\frac{b\left(c^2d-e\right)^{5/2}\left(2c^2d+5e\right)\text{ArcTan}\left[\frac{\sqrt{c^2d-e}\,x}{\sqrt{d+ex^2}}\right]}{35c^7e^2}+\frac{b\left(35c^6d^3+70c^4d^2e-168c^2de^2+80e^3\right)\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right]}{560c^7e^{3/2}}$$

Result (type 3, 418 leaves):

$$-\frac{1}{1680c^7e^2}\left(c^2\sqrt{d+ex^2}\left(48ac^5\left(2d-5ex^2\right)\left(d+ex^2\right)^2+bex\left(120e^2-6c^2e\left(37d+10ex^2\right)+c^4\left(57d^2+106dex^2+40e^2x^4\right)\right)\right)+48bc^7\left(2d-5ex^2\right)\left(d+ex^2\right)^{5/2}\text{ArcTan}[cx]+24\,i\,b\left(c^2d-e\right)^{5/2}\left(2c^2d+5e\right)\text{Log}\left[-\frac{140\,i\,c^8e^2\left(cd-i\,ex+\sqrt{c^2d-e}\sqrt{d+ex^2}\right)}{b\left(c^2d-e\right)^{7/2}\left(2c^2d+5e\right)\left(i+cx\right)}\right]-24\,i\,b\left(c^2d-e\right)^{5/2}\left(2c^2d+5e\right)\text{Log}\left[\frac{140\,i\,c^8e^2\left(cd+i\,ex+\sqrt{c^2d-e}\sqrt{d+ex^2}\right)}{b\left(c^2d-e\right)^{7/2}\left(2c^2d+5e\right)\left(-i+cx\right)}\right]-3b\sqrt{e}\left(35c^6d^3+70c^4d^2e-168c^2de^2+80e^3\right)\text{Log}\left[ex+\sqrt{e}\sqrt{d+ex^2}\right]\right)$$

Problem 1185: Result unnecessarily involves imaginary or complex numbers.

$$\int x\left(d+ex^2\right)^{3/2}\left(a+b\,\text{ArcTan}[cx]\right)dx$$

Optimal (type 3, 181 leaves, 8 steps):

$$-\frac{b\left(7c^2d-4e\right)x\sqrt{d+ex^2}}{40c^3}-\frac{bx\left(d+ex^2\right)^{3/2}}{20c}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\,\text{ArcTan}[cx]\right)}{5e}-\frac{b\left(c^2d-e\right)^{5/2}\text{ArcTan}\left[\frac{\sqrt{c^2d-e}\,x}{\sqrt{d+ex^2}}\right]}{5c^5e}-\frac{b\left(15c^4d^2-20c^2de+8e^2\right)\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+ex^2}}\right]}{40c^5\sqrt{e}}$$

Result (type 3, 313 leaves):

$$\frac{1}{40 c^5 e}\left(c^2 \sqrt{d+e x^2}\left(8 a c^3 \left(d+e x^2\right)^2+b e x \left(4 e-c^2 \left(9 d+2 e x^2\right)\right)\right)+8 b c^5 \left(d+e x^2\right)^{5/2} \text{ArcTan}[c x]-4 i b \left(c^2 d-e\right)^{5/2} \text{Log}\left[\frac{20 c^6 e \left(-i c d+e x-i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{7/2} (-i+c x)}\right]+4 i b \left(c^2 d-e\right)^{5/2} \text{Log}\left[\frac{20 c^6 e \left(i c d+e x+i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{7/2} (i+c x)}\right]-b \sqrt{e} \left(15 c^4 d^2-20 c^2 d e+8 e^2\right) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 1192: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(d+e x^2\right)^{3/2} (a+b \text{ArcTan}[c x])}{x^6} \, dx$$

Optimal (type 3, 178 leaves, 10 steps):

$$\frac{b c \left(4 c^2 d-7 e\right) \sqrt{d+e x^2}}{40 x^2}-\frac{b c \left(d+e x^2\right)^{3/2}}{20 x^4}-\frac{\left(d+e x^2\right)^{5/2} (a+b \text{ArcTan}[c x])}{5 d x^5}-\frac{b c \left(8 c^4 d^2-20 c^2 d e+15 e^2\right) \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{40 \sqrt{d}}+\frac{b \left(c^2 d-e\right)^{5/2} \text{ArcTanh}\left[\frac{c \sqrt{d+e x^2}}{\sqrt{c^2 d-e}}\right]}{5 d}$$

Result (type 3, 334 leaves):

$$\frac{1}{40 d x^5}\left(-\sqrt{d+e x^2}\left(8 a \left(d+e x^2\right)^2+b c d x \left(9 e x^2+d \left(2-4 c^2 x^2\right)\right)\right)-8 b \left(d+e x^2\right)^{5/2} \text{ArcTan}[c x]+b c \sqrt{d} \left(8 c^4 d^2-20 c^2 d e+15 e^2\right) x^5 \text{Log}[x]-b c \sqrt{d} \left(8 c^4 d^2-20 c^2 d e+15 e^2\right) x^5 \text{Log}\left[d+\sqrt{d} \sqrt{d+e x^2}\right]+4 b \left(c^2 d-e\right)^{5/2} x^5 \text{Log}\left[-\frac{20 c d \left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{7/2} (i+c x)}\right]+4 b \left(c^2 d-e\right)^{5/2} x^5 \text{Log}\left[-\frac{20 c d \left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{7/2} (-i+c x)}\right]\right)$$

Problem 1193: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 345 leaves, 11 steps):

$$\frac{b\left(59 c^6 d^3+712 c^4 d^2 e-1104 c^2 d e^2+448 e^3\right) x \sqrt{d+e x^2}}{8064 c^7 e}-\frac{b\left(69 c^4 d^2-520 c^2 d e+336 e^2\right) x\left(d+e x^2\right)^{3/2}}{12096 c^5 e}-\frac{b\left(33 c^2 d-56 e\right) x\left(d+e x^2\right)^{5/2}}{3024 c^3 e}-\frac{b x\left(d+e x^2\right)^{7/2}}{72 c e}-\frac{d\left(d+e x^2\right)^{7/2}(a+b \operatorname{ArcTan}[c x])}{7 e^2}+\frac{\left(d+e x^2\right)^{9/2}(a+b \operatorname{ArcTan}[c x])}{9 e^2}+\frac{b\left(c^2 d-e\right)^{7/2}\left(2 c^2 d+7 e\right) \operatorname{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{63 c^9 e^2}+\frac{b\left(315 c^8 d^4+840 c^6 d^3 e-3024 c^4 d^2 e^2+2880 c^2 d e^3-896 e^4\right) \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{8064 c^9 e^{3/2}}$$

Result (type 3, 470 leaves):

$$-\frac{1}{24192 c^9 e^2}\left(c^2 \sqrt{d+e x^2}\left(384 a c^7\left(2 d-7 e x^2\right)\left(d+e x^2\right)^3+b e x\left(-1344 e^3+48 c^2 e^2\left(83 d+14 e x^2\right)-8 c^4 e\left(453 d^2+242 d e x^2+56 e^2 x^4\right)+3 c^6\left(187 d^3+558 d^2 e x^2+424 d e^2 x^4+112 e^3 x^6\right)\right)\right)+384 b c^9\left(2 d-7 e x^2\right)\left(d+e x^2\right)^{7/2} \operatorname{ArcTan}[c x]+192 i b\left(c^2 d-e\right)^{7/2}\left(2 c^2 d+7 e\right) \operatorname{Log}\left[-\frac{252 i c^{10} e^2\left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{9/2}\left(2 c^2 d+7 e\right)(i+c x)}\right]-192 i b\left(c^2 d-e\right)^{7/2}\left(2 c^2 d+7 e\right) \operatorname{Log}\left[\frac{252 i c^{10} e^2\left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{9/2}\left(2 c^2 d+7 e\right)(-i+c x)}\right]+3 b \sqrt{e}\left(-315 c^8 d^4-840 c^6 d^3 e+3024 c^4 d^2 e^2-2880 c^2 d e^3+896 e^4\right) \operatorname{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 1195: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 233 leaves, 9 steps):

$$-\frac{b\left(19 c^4 d^2-22 c^2 d e+8 e^2\right) x \sqrt{d+e x^2}}{112 c^5}-\frac{b\left(11 c^2 d-6 e\right) x\left(d+e x^2\right)^{3/2}}{168 c^3}-\frac{b x\left(d+e x^2\right)^{5/2}}{42 c}+\frac{\left(d+e x^2\right)^{7/2}(a+b \operatorname{ArcTan}[c x])}{7 e}-\frac{b\left(c^2 d-e\right)^{7/2} \operatorname{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{7 c^7 e}-\frac{b\left(35 c^6 d^3-70 c^4 d^2 e+56 c^2 d e^2-16 e^3\right) \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{112 c^7 \sqrt{e}}$$

Result (type 3, 353 leaves):

$$\frac{1}{336\,c^7\,e}\left(c^2\,\sqrt{d+e\,x^2}\,\left(48\,a\,c^5\,\left(d+e\,x^2\right)^3-b\,e\,x\,\left(24\,e^2-6\,c^2\,e\,\left(13\,d+2\,e\,x^2\right)+c^4\,\left(87\,d^2+38\,d\,e\,x^2+8\,e^2\,x^4\right)\right)\right)+\right.$$

$$48\,b\,c^7\,\left(d+e\,x^2\right)^{7/2}\,\text{ArcTan}[c\,x]-24\,i\,b\,\left(c^2\,d-e\right)^{7/2}\,\text{Log}\left[\frac{28\,c^8\,e\,\left(-i\,c\,d+e\,x-i\,\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^2\,d-e\right)^{9/2}\,\left(-i+c\,x\right)}\right]+$$

$$\left.24\,i\,b\,\left(c^2\,d-e\right)^{7/2}\,\text{Log}\left[\frac{28\,c^8\,e\,\left(i\,c\,d+e\,x+i\,\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^2\,d-e\right)^{9/2}\,\left(i+c\,x\right)}\right]+3\,b\,\sqrt{e}\,\left(-35\,c^6\,d^3+70\,c^4\,d^2\,e-56\,c^2\,d\,e^2+16\,e^3\right)\,\text{Log}\left[e\,x+\sqrt{e}\,\sqrt{d+e\,x^2}\right]\right)$$

Problem 1201: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 176 leaves, 8 steps):

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

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

Result (type 3, 377 leaves):

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

$$\left.\frac{i\,b\,\left(2\,c^4\,d^2-c^2\,d\,e-e^2\right)\,\text{Log}\left[-\frac{12\,i\,c^4\,e^2\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\sqrt{c^2\,d-e}\,\left(-2\,c^4\,d^2+c^2\,d\,e+e^2\right)\,\left(-i+c\,x\right)}\right]}{c^3\,\sqrt{c^2\,d-e}}+\frac{b\,\sqrt{e}\,\left(3\,c^2\,d+2\,e\right)\,\text{Log}\left[e\,x+\sqrt{e}\,\sqrt{d+e\,x^2}\right]}{c^3}\right)$$

Problem 1203: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 103 leaves, 6 steps):

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

Result (type 3, 251 leaves):

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

Problem 1206: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 100 leaves, 7 steps):

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

Result (type 3, 247 leaves):

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

Problem 1208: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 179 leaves, 9 steps):

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

Result (type 3, 372 leaves):

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

Problem 1209: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 137 leaves, 7 steps):

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

Result (type 3, 321 leaves):

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

Problem 1211: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 71 leaves, 3 steps):

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

Result (type 3, 210 leaves):

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

Problem 1212: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 70 leaves, 5 steps):

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

Result (type 3, 202 leaves):

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

Problem 1214: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 135 leaves, 8 steps):

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

Result (type 3, 306 leaves):

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

Problem 1216: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 249 leaves, 14 steps):

$$-\frac{b c \sqrt{d+e x^2}}{6 d^2 x^2}-\frac{a+b \text{ArcTan}[c x]}{3 d x^3 \sqrt{d+e x^2}}+\frac{4 e (a+b \text{ArcTan}[c x])}{3 d^2 x \sqrt{d+e x^2}}+\frac{8 e^2 x (a+b \text{ArcTan}[c x])}{3 d^3 \sqrt{d+e x^2}}+$$

$$\frac{b c e \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{6 d^{5/2}}+\frac{b c (c^2 d+4 e) \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{3 d^{5/2}}-\frac{b (c^4 d^2+4 c^2 d e-8 e^2) \text{ArcTanh}\left[\frac{c \sqrt{d+e x^2}}{\sqrt{c^2 d-e}}\right]}{3 d^3 \sqrt{c^2 d-e}}$$

Result (type 3, 405 leaves):

$$-\frac{1}{6 d^3}\left(\frac{b c d x (d+e x^2)+2 a (d^2-4 d e x^2-8 e^2 x^4)}{x^3 \sqrt{d+e x^2}}+\right.$$

$$\frac{2 b (d^2-4 d e x^2-8 e^2 x^4) \text{ArcTan}[c x]}{x^3 \sqrt{d+e x^2}}+b c \sqrt{d} (2 c^2 d+9 e) \text{Log}[x]-b c \sqrt{d} (2 c^2 d+9 e) \text{Log}\left[d+\sqrt{d} \sqrt{d+e x^2}\right]+$$

$$\left.\frac{b (c^4 d^2+4 c^2 d e-8 e^2) \text{Log}\left[\frac{12 c d^3 \left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \sqrt{c^2 d-e} (c^4 d^2+4 c^2 d e-8 e^2) (i+c x)}\right]}{\sqrt{c^2 d-e}}+\frac{b (c^4 d^2+4 c^2 d e-8 e^2) \text{Log}\left[\frac{12 c d^3 \left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \sqrt{c^2 d-e} (c^4 d^2+4 c^2 d e-8 e^2) (-i+c x)}\right]}{\sqrt{c^2 d-e}}\right)$$

Problem 1218: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 143 leaves, 6 steps):

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

Result (type 3, 326 leaves):

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

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

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

Problem 1219: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 109 leaves, 5 steps):

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

Result (type 3, 252 leaves):

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

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

Problem 1220: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 110 leaves, 4 steps):

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

Result (type 3, 259 leaves) :

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

Problem 1221: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 144 leaves, 7 steps) :

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

Result (type 3, 317 leaves) :

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

Problem 1223: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 274 leaves, 13 steps):

$$\frac{b\, c}{d^2 \sqrt{d + e\, x^2}} - \frac{8\, b\, e}{3\, c\, d^3 \sqrt{d + e\, x^2}} - \frac{b \left(3\, c^4 d^2 - 12\, c^2 d\, e + 8\, e^2\right)}{3\, c\, d^3 \left(c^2 d - e\right) \sqrt{d + e\, x^2}} - \frac{a + b \,\text{ArcTan}[c\, x]}{d\, x \left(d + e\, x^2\right)^{3/2}} - \frac{4\, e\, x \left(a + b \,\text{ArcTan}[c\, x]\right)}{3\, d^2 \left(d + e\, x^2\right)^{3/2}} - \frac{8\, e\, x \left(a + b \,\text{ArcTan}[c\, x]\right)}{3\, d^3 \sqrt{d + e\, x^2}} - \frac{b\, c \,\text{ArcTanh}\left[\frac{\sqrt{d + e\, x^2}}{\sqrt{d}}\right]}{d^{5/2}} + \frac{b \left(3\, c^4 d^2 - 12\, c^2 d\, e + 8\, e^2\right) \text{ArcTanh}\left[\frac{c \sqrt{d + e\, x^2}}{\sqrt{c^2 d - e}}\right]}{3\, d^3 \left(c^2 d - e\right)^{3/2}}$$

Result (type 3, 418 leaves):

$$\frac{1}{6\, d^3} \left(-\frac{2\, a\, d\, e\, x}{\left(d + e\, x^2\right)^{3/2}} + \frac{2\, e \left(b\, c\, d + 5\, a \left(-c^2 d + e\right) x\right)}{\left(c^2 d - e\right) \sqrt{d + e\, x^2}} - \frac{6\, a \sqrt{d + e\, x^2}}{x} - \frac{2\, b \left(3\, d^2 + 12\, d\, e\, x^2 + 8\, e^2 x^4\right) \text{ArcTan}[c\, x]}{x \left(d + e\, x^2\right)^{3/2}} + 6\, b\, c \sqrt{d}\, \text{Log}[x] - 6\, b\, c \sqrt{d}\, \text{Log}\left[d + \sqrt{d} \sqrt{d + e\, x^2}\right] + \frac{b \left(3\, c^4 d^2 - 12\, c^2 d\, e + 8\, e^2\right) \text{Log}\left[-\frac{12\, c\, d^3 \sqrt{c^2 d - e} \left(c\, d - i\, e\, x + \sqrt{c^2 d - e} \sqrt{d + e\, x^2}\right)}{b \left(3\, c^4 d^2 - 12\, c^2 d\, e + 8\, e^2\right) (i + c\, x)}\right]}{\left(c^2 d - e\right)^{3/2}} + \frac{b \left(3\, c^4 d^2 - 12\, c^2 d\, e + 8\, e^2\right) \text{Log}\left[-\frac{12\, c\, d^3 \sqrt{c^2 d - e} \left(c\, d + i\, e\, x + \sqrt{c^2 d - e} \sqrt{d + e\, x^2}\right)}{b \left(3\, c^4 d^2 - 12\, c^2 d\, e + 8\, e^2\right) (-i + c\, x)}\right]}{\left(c^2 d - e\right)^{3/2}}\right)$$

Problem 1225: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 423 leaves, 18 steps):

$$-\frac{b c e}{2 d^3 \sqrt{d+e x^2}}+\frac{16 b e^2}{3 c d^4 \sqrt{d+e x^2}}-\frac{b c \left(c^2 d+6 e\right)}{3 d^3 \sqrt{d+e x^2}}+\frac{b \left(c^2 d-2 e\right) \left(c^4 d^2+8 c^2 d e-8 e^2\right)}{3 c d^4 \left(c^2 d-e\right) \sqrt{d+e x^2}}-\frac{b c}{6 d^2 x^2 \sqrt{d+e x^2}}-$$
$$\frac{a+b \operatorname{ArcTan}[c x]}{3 d x^3 \left(d+e x^2\right)^{3/2}}+\frac{2 e (a+b \operatorname{ArcTan}[c x])}{d^2 x \left(d+e x^2\right)^{3/2}}+\frac{8 e^2 x (a+b \operatorname{ArcTan}[c x])}{3 d^3 \left(d+e x^2\right)^{3/2}}+\frac{16 e^2 x (a+b \operatorname{ArcTan}[c x])}{3 d^4 \sqrt{d+e x^2}}+$$
$$\frac{b c e \operatorname{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{2 d^{7/2}}+\frac{b c \left(c^2 d+6 e\right) \operatorname{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{3 d^{7/2}}-\frac{b \left(c^2 d-2 e\right) \left(c^4 d^2+8 c^2 d e-8 e^2\right) \operatorname{ArcTanh}\left[\frac{c \sqrt{d+e x^2}}{\sqrt{c^2 d-e}}\right]}{3 d^4 \left(c^2 d-e\right)^{3/2}}$$

Result (type 3, 510 leaves) :

$$-\frac{1}{6 d^4}\left(\frac{2 a \left(d^3-6 d^2 e x^2-24 d e^2 x^4-16 e^3 x^6\right)}{x^3 \left(d+e x^2\right)^{3/2}}+\right.$$
$$\frac{b c d \left(e \left(-d+e x^2\right)+c^2 d \left(d+e x^2\right)\right)}{\left(c^2 d-e\right) x^2 \sqrt{d+e x^2}}+\frac{2 b \left(d^3-6 d^2 e x^2-24 d e^2 x^4-16 e^3 x^6\right) \operatorname{ArcTan}[c x]}{x^3 \left(d+e x^2\right)^{3/2}}+b c \sqrt{d} \left(2 c^2 d+15 e\right) \operatorname{Log}[x]-$$
$$b c \sqrt{d} \left(2 c^2 d+15 e\right) \operatorname{Log}\left[d+\sqrt{d} \sqrt{d+e x^2}\right]+\frac{b \left(c^6 d^3+6 c^4 d^2 e-24 c^2 d e^2+16 e^3\right) \operatorname{Log}\left[\frac{12 c d^4 \sqrt{c^2 d-e} \left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^6 d^3+6 c^4 d^2 e-24 c^2 d e^2+16 e^3\right) (i+c x)}\right]}{\left(c^2 d-e\right)^{3/2}}+$$
$$\left.\frac{b \left(c^6 d^3+6 c^4 d^2 e-24 c^2 d e^2+16 e^3\right) \operatorname{Log}\left[\frac{12 c d^4 \sqrt{c^2 d-e} \left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^6 d^3+6 c^4 d^2 e-24 c^2 d e^2+16 e^3\right) (-i+c x)}\right]}{\left(c^2 d-e\right)^{3/2}}\right)$$

Problem 1226: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\operatorname{ArcTan}[a x]}{\left(c+d x^2\right)^{7/2}} \, dx$$

Optimal (type 3, 208 leaves, 8 steps) :

$$-\frac{a}{15\, c\,(a^2 c-d)\,(c+d x^2)^{3/2}}-\frac{a\,(7 a^2 c-4 d)}{15\, c^2\,(a^2 c-d)^2\,\sqrt{c+d x^2}}+\frac{x\,\mathrm{ArcTan}[a x]}{5\, c\,(c+d x^2)^{5/2}}+$$

$$\frac{4\, x\,\mathrm{ArcTan}[a x]}{15\, c^2\,(c+d x^2)^{3/2}}+\frac{8\, x\,\mathrm{ArcTan}[a x]}{15\, c^3\,\sqrt{c+d x^2}}+\frac{(15 a^4 c^2-20 a^2 c d+8 d^2)\,\mathrm{ArcTanh}\left[\frac{a\sqrt{c+d x^2}}{\sqrt{a^2 c-d}}\right]}{15\, c^3\,(a^2 c-d)^{5/2}}$$

Result (type 3, 345 leaves):

$$\frac{1}{30\, c^3}\left(-\frac{2\, a\, c\,\left(-d\,(5 c+4 d x^2)+a^2 c\,(8 c+7 d x^2)\right)}{(-a^2 c+d)^2\,(c+d x^2)^{3/2}}+\frac{2\, x\,(15 c^2+20 c d x^2+8 d^2 x^4)\,\mathrm{ArcTan}[a x]}{(c+d x^2)^{5/2}}+\right.$$

$$\left.\frac{(15 a^4 c^2-20 a^2 c d+8 d^2)\,\mathrm{Log}\left[-\frac{60\, a\, c^3\,(a^2 c-d)^{3/2}\,\left(a c-i\, d x+\sqrt{a^2 c-d}\,\sqrt{c+d x^2}\right)}{(15 a^4 c^2-20 a^2 c d+8 d^2)\,(i+a x)}\right]}{(a^2 c-d)^{5/2}}+\frac{(15 a^4 c^2-20 a^2 c d+8 d^2)\,\mathrm{Log}\left[-\frac{60\, a\, c^3\,(a^2 c-d)^{3/2}\,\left(a c+i\, d x+\sqrt{a^2 c-d}\,\sqrt{c+d x^2}\right)}{(15 a^4 c^2-20 a^2 c d+8 d^2)\,(-i+a x)}\right]}{(a^2 c-d)^{5/2}}\right)$$

Problem 1227: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\mathrm{ArcTan}[a x]}{(c+d x^2)^{9/2}}\,dx$$

Optimal (type 3, 293 leaves, 8 steps):

$$-\frac{a}{35\, c\,(a^2 c-d)\,(c+d x^2)^{5/2}}-\frac{a\,(11 a^2 c-6 d)}{105\, c^2\,(a^2 c-d)^2\,(c+d x^2)^{3/2}}-\frac{a\,(19 a^4 c^2-22 a^2 c d+8 d^2)}{35\, c^3\,(a^2 c-d)^3\,\sqrt{c+d x^2}}+\frac{x\,\mathrm{ArcTan}[a x]}{7\, c\,(c+d x^2)^{7/2}}+$$

$$\frac{6\, x\,\mathrm{ArcTan}[a x]}{35\, c^2\,(c+d x^2)^{5/2}}+\frac{8\, x\,\mathrm{ArcTan}[a x]}{35\, c^3\,(c+d x^2)^{3/2}}+\frac{16\, x\,\mathrm{ArcTan}[a x]}{35\, c^4\,\sqrt{c+d x^2}}+\frac{(35 a^6 c^3-70 a^4 c^2 d+56 a^2 c d^2-16 d^3)\,\mathrm{ArcTanh}\left[\frac{a\sqrt{c+d x^2}}{\sqrt{a^2 c-d}}\right]}{35\, c^4\,(a^2 c-d)^{7/2}}$$

Result (type 3, 450 leaves):

$$\frac{1}{210\,c^4}\left(-\frac{1}{\left(a^2 c-d\right)^3\left(c+d x^2\right)^{5/2}}2\,a\,c\left(3\,c^2\left(-a^2 c+d\right)^2+c\left(11\,a^2 c-6\,d\right)\left(a^2 c-d\right)\left(c+d x^2\right)+3\left(19\,a^4 c^2-22\,a^2 c\,d+8\,d^2\right)\left(c+d x^2\right)^2\right)+\right.$$

$$\frac{6\,x\left(35\,c^3+70\,c^2 d\,x^2+56\,c\,d^2 x^4+16\,d^3 x^6\right)\text{ArcTan}[a\,x]}{\left(c+d x^2\right)^{7/2}}+\frac{3\left(35\,a^6 c^3-70\,a^4 c^2 d+56\,a^2 c\,d^2-16\,d^3\right)\text{Log}\left[-\frac{140\,a\,c^4\left(a^2 c-d\right)^{5/2}\left(a\,c-i\,d\,x+\sqrt{a^2 c-d}\,\sqrt{c+d x^2}\right)}{\left(35\,a^6 c^3-70\,a^4 c^2 d+56\,a^2 c\,d^2-16\,d^3\right)(i+a\,x)}\right]}{\left(a^2 c-d\right)^{7/2}}+$$

$$\left.\frac{3\left(35\,a^6 c^3-70\,a^4 c^2 d+56\,a^2 c\,d^2-16\,d^3\right)\text{Log}\left[-\frac{140\,a\,c^4\left(a^2 c-d\right)^{5/2}\left(a\,c+i\,d\,x+\sqrt{a^2 c-d}\,\sqrt{c+d x^2}\right)}{\left(35\,a^6 c^3-70\,a^4 c^2 d+56\,a^2 c\,d^2-16\,d^3\right)(-i+a\,x)}\right]}{\left(a^2 c-d\right)^{7/2}}\right)$$

Problem 1241: Result more than twice size of optimal antiderivative.

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

Optimal (type 6, 129 leaves, 4 steps):

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

Result (type 6, 566 leaves):

$$-\frac{a\,x^{-2-2p}\,(d+e\,x^2)^{1+p}}{2\,d\,(1+p)}+$$

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

$$(1+c^2\,x^2)\left(c^2\,d\,(-1+2p)\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-p,\,1,\,\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]+\right.$$

$$\left.\left.\left.2\,c^2\,x^2\left(-e\,p\,\text{AppellF1}\left[\frac{1}{2}-p,\,1-p,\,1,\,\frac{3}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]+c^2\,d\,\text{AppellF1}\left[\frac{1}{2}-p,\,-p,\,2,\,\frac{3}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]\right)\right)\right)\right)-$$

$$\left(e\,(-3+2p)\,(c\,x)^{1-2p}\,(d+e\,x^2)^p\,\text{AppellF1}\left[\frac{1}{2}-p,\,-p,\,1,\,\frac{3}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]\right)\Big/$$

$$\left(2\,(1+p)\,(-1+2p)\,(1+c^2\,x^2)\left(c^2\,d\,(-3+2p)\,\text{AppellF1}\left[\frac{1}{2}-p,\,-p,\,1,\,\frac{3}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]+\right.\right.$$

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

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

Problem 1243: Result more than twice size of optimal antiderivative.

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

Optimal (type 6, 285 leaves, 8 steps):

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

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

$$\frac{b\,e\,x^{-3-2p}\,(d+e\,x^2)^p\left(1+\frac{e\,x^2}{d}\right)^{-p}\text{Hypergeometric2F1}\left[\frac{1}{2}\,(-3-2p),\,-1-p,\,\frac{1}{2}\,(-1-2p),\,-\frac{e\,x^2}{d}\right]}{2\,c\,d\,(6+13p+9p^2+2p^3)}$$

Result (type 6, 1108 leaves):

$$\frac{1}{c} b x^{-5-2p} (c x)^{5+2p} \Bigg(-\Bigg(\Bigg(c^2 d (1+2p) (c x)^{-3-2p} (d+e x^2)^p \text{AppellF1}\Big[-\frac{3}{2}-p, -p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big]\Bigg) \Big/$$
$$\Bigg(2 (1+p) (2+p) (3+2p) (1+c^2 x^2) \Bigg(c^2 d (1+2p) \text{AppellF1}\Big[-\frac{3}{2}-p, -p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big] +$$
$$2 c^2 x^2 \Bigg(-e p \text{AppellF1}\Big[-\frac{1}{2}-p, 1-p, 1, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big] + c^2 d \text{AppellF1}\Big[-\frac{1}{2}-p, -p, 2, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big]\Bigg)\Bigg)\Bigg)\Bigg) -$$
$$\Bigg(c^2 d p (1+2p) (c x)^{-3-2p} (d+e x^2)^p \text{AppellF1}\Big[-\frac{3}{2}-p, -p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big]\Bigg) \Big/$$
$$\Bigg(2 (1+p) (2+p) (3+2p) (1+c^2 x^2) \Bigg(c^2 d (1+2p) \text{AppellF1}\Big[-\frac{3}{2}-p, -p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big] +$$
$$2 c^2 x^2 \Bigg(-e p \text{AppellF1}\Big[-\frac{1}{2}-p, 1-p, 1, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big] + c^2 d \text{AppellF1}\Big[-\frac{1}{2}-p, -p, 2, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big]\Bigg)\Bigg)\Bigg) -$$
$$\Bigg(e p (-1+2p) (c x)^{-1-2p} (d+e x^2)^p \text{AppellF1}\Big[-\frac{1}{2}-p, -p, 1, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big]\Bigg) \Big/$$
$$\Bigg(2 (1+p) (2+p) (1+2p) (1+c^2 x^2) \Bigg(c^2 d (-1+2p) \text{AppellF1}\Big[-\frac{1}{2}-p, -p, 1, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big] +$$
$$2 c^2 x^2 \Bigg(-e p \text{AppellF1}\Big[\frac{1}{2}-p, 1-p, 1, \frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big] + c^2 d \text{AppellF1}\Big[\frac{1}{2}-p, -p, 2, \frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big]\Bigg)\Bigg)\Bigg) +$$
$$\Bigg(e^2 (-3+2p) (c x)^{1-2p} (d+e x^2)^p \text{AppellF1}\Big[\frac{1}{2}-p, -p, 1, \frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big]\Bigg) \Big/$$
$$\Bigg(2 c^2 d (1+p) (2+p) (-1+2p) (1+c^2 x^2) \Bigg(c^2 d (-3+2p) \text{AppellF1}\Big[\frac{1}{2}-p, -p, 1, \frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big] +$$
$$2 c^2 x^2 \Bigg(-e p \text{AppellF1}\Big[\frac{3}{2}-p, 1-p, 1, \frac{5}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big] + c^2 d \text{AppellF1}\Big[\frac{3}{2}-p, -p, 2, \frac{5}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\Big]\Bigg)\Bigg)\Bigg) -$$
$$\frac{(c x)^{-2(2+p)} (d+e x^2)^p (c^2 d (1+p) - c^2 e x^2) (c^2 d + c^2 e x^2) \text{ArcTan}[c x]}{2 c^4 d^2 (1+p) (2+p)}\Bigg) -$$
$$\frac{a x^{-4-2p} (d+e x^2)^p \left(1+\frac{e x^2}{d}\right)^{-p} \text{Hypergeometric2F1}\Big[-2-p, -p, -1-p, -\frac{e x^2}{d}\Big]}{2 (2+p)}$$

Problem 1245: Result more than twice size of optimal antiderivative.

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

Optimal (type 6, 466 leaves, 10 steps):

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

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

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

$$\left(c^3 d^2(1+p)(2+p)(3+p)(5+2p)\right)-\frac{b e^2 x^{-3-2p}\left(d+e x^2\right)^p\left(1+\frac{e x^2}{d}\right)^{-p}\text{Hypergeometric2F1}\left[\frac{1}{2}(-3-2p),-1-p,\frac{1}{2}(-1-2p),-\frac{e x^2}{d}\right]}{c d^2(1+p)(2+p)(3+p)(3+2p)}$$

Result (type 6, 1880 leaves) :

$$\frac{1}{c}b x^{-7-2p}(c x)^{7+2p}\left(-\left(\left(c^2 d(3+2p)(c x)^{-5-2p}\left(d+e x^2\right)^p\text{AppellF1}\left[-\frac{5}{2}-p,-p,1,-\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\Big/\right.\right.$$

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

$$\left.\left.\left.2c^2 x^2\left(-e p\,\text{AppellF1}\left[-\frac{3}{2}-p,1-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]+c^2 d\,\text{AppellF1}\left[-\frac{3}{2}-p,-p,2,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\right)\right)\right)-$$

$$\left(3c^2 d p(3+2p)(c x)^{-5-2p}\left(d+e x^2\right)^p\text{AppellF1}\left[-\frac{5}{2}-p,-p,1,-\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\Big/$$

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

$$\left.\left.2c^2 x^2\left(-e p\,\text{AppellF1}\left[-\frac{3}{2}-p,1-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]+c^2 d\,\text{AppellF1}\left[-\frac{3}{2}-p,-p,2,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\right)\right)-$$

$$\left(c^2 d p^2(3+2p)(c x)^{-5-2p}\left(d+e x^2\right)^p\text{AppellF1}\left[-\frac{5}{2}-p,-p,1,-\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\Big/$$

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

$$\left.\left.2c^2 x^2\left(-e p\,\text{AppellF1}\left[-\frac{3}{2}-p,1-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]+c^2 d\,\text{AppellF1}\left[-\frac{3}{2}-p,-p,2,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\right)\right)-$$

$$\left(e p(1+2p)(c x)^{-3-2p}\left(d+e x^2\right)^p\text{AppellF1}\left[-\frac{3}{2}-p,-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\Big/$$

$$\left(2(1+p)(2+p)(3+p)(3+2p)\left(1+c^2 x^2\right)\left(c^2 d(1+2p)\text{AppellF1}\left[-\frac{3}{2}-p,-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]+\right.\right.$$

$$2\,c^2\,x^2\,\left(-e\,p\,\text{AppellF1}\left[-\frac{1}{2}-p,\,1-p,\,1,\,\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]+c^2\,d\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-p,\,2,\,\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]\right)\right)\right)-$$

$$\left(e\,p^2\,(1+2\,p)\,(c\,x)^{-3-2\,p}\,\left(d+e\,x^2\right)^p\,\text{AppellF1}\left[-\frac{3}{2}-p,\,-p,\,1,\,-\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]\right)\Big/$$

$$\left(2\,(1+p)\,(2+p)\,(3+p)\,(3+2\,p)\,\left(1+c^2\,x^2\right)\,\left(c^2\,d\,(1+2\,p)\,\text{AppellF1}\left[-\frac{3}{2}-p,\,-p,\,1,\,-\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]+\right.\right.$$

$$2\,c^2\,x^2\,\left(-e\,p\,\text{AppellF1}\left[-\frac{1}{2}-p,\,1-p,\,1,\,\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]+c^2\,d\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-p,\,2,\,\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]\right)\right)\right)+$$

$$\left(e^2\,p\,(-1+2\,p)\,(c\,x)^{-1-2\,p}\,\left(d+e\,x^2\right)^p\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-p,\,1,\,\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]\right)\Big/$$

$$\left(c^2\,d\,(1+p)\,(2+p)\,(3+p)\,(1+2\,p)\,\left(1+c^2\,x^2\right)\,\left(c^2\,d\,(-1+2\,p)\,\text{AppellF1}\left[-\frac{1}{2}-p,\,-p,\,1,\,\frac{1}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]+\right.\right.$$

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

$$\left(e^3\,(-3+2\,p)\,(c\,x)^{1-2\,p}\,\left(d+e\,x^2\right)^p\,\text{AppellF1}\left[\frac{1}{2}-p,\,-p,\,1,\,\frac{3}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]\right)\Big/$$

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

$$2\,c^2\,x^2\,\left(-e\,p\,\text{AppellF1}\left[\frac{3}{2}-p,\,1-p,\,1,\,\frac{5}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]+c^2\,d\,\text{AppellF1}\left[\frac{3}{2}-p,\,-p,\,2,\,\frac{5}{2}-p,\,-\frac{e\,x^2}{d},\,-c^2\,x^2\right]\right)\right)\right)-$$

$$\left((c\,x)^{-2\,(3+p)}\,\left(d+e\,x^2\right)^p\,\left(c^2\,d+c^2\,e\,x^2\right)\,\left(c^4\,d^2\,\left(2+3\,p+p^2\right)-2\,c^4\,d\,e\,(1+p)\,x^2+2\,c^4\,e^2\,x^4\right)\,\text{ArcTan}[c\,x]\right)\Big/\left(2\,c^6\,d^3\,(1+p)\,(2+p)\,(3+p)\right)\Bigg)-$$

$$\frac{a\,x^{-6-2\,p}\,\left(d+e\,x^2\right)^p\,\left(1+\frac{e\,x^2}{d}\right)^{-p}\,\text{Hypergeometric2F1}\left[-3-p,\,-p,\,-2-p,\,-\frac{e\,x^2}{d}\right]}{2\,(3+p)}$$

Problem 1261: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 590 leaves, 11 steps) :

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

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

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

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

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

Result (type 4, 1567 leaves):

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

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

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

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

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

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

$$\frac{1}{c^2} b^2 \Bigg(-4 c e x \operatorname{ArcTan}[c x] + 2 e \operatorname{ArcTan}[c x]^2 + 2 c^2 e x^2 \operatorname{ArcTan}[c x]^2 + 4 c^2 d \operatorname{ArcTan}[c x]^2 \operatorname{Log}\left[1 + e^{2 i \operatorname{ArcTan}[c x]}\right] -$$

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

$$2 c^2 d \operatorname{ArcTan}[c x]^2 \operatorname{Log}\left[1 + \frac{\left(c^2 d + e - 2 \sqrt{c^2 d e}\right) e^{2 i \operatorname{ArcTan}[c x]}}{c^2 d - e}\right] + 4 c^2 d \operatorname{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d - e}}\right] \operatorname{ArcTan}[c x]$$

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

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

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

$$4 c^2 d \operatorname{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d - e}}\right] \operatorname{ArcTan}[c x] \operatorname{Log}\left[\frac{2 i c^2 d - 2 i \sqrt{c^2 d e} + 2 c \left(-e + \sqrt{c^2 d e}\right) x}{\left(c^2 d - e\right) (i + c x)}\right] +$$

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

$$4 c^2 d \operatorname{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d - e}}\right] \operatorname{ArcTan}[c x] \operatorname{Log}\left[1 + \frac{\left(c^2 d + e + 2 \sqrt{c^2 d e}\right) \left(\operatorname{Cos}[2 \operatorname{ArcTan}[c x]] + i \operatorname{Sin}[2 \operatorname{ArcTan}[c x]]\right)}{c^2 d - e}\right] +$$

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

$$4 i c^2 d \operatorname{ArcTan}[c x] \operatorname{PolyLog}\left[2, -e^{2 i \operatorname{ArcTan}[c x]}\right] + 2 i c^2 d \operatorname{ArcTan}[c x] \operatorname{PolyLog}\left[2, \frac{\left(-c \sqrt{d} + \sqrt{e}\right) e^{2 i \operatorname{ArcTan}[c x]}}{c \sqrt{d} + \sqrt{e}}\right] +$$

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

$$c^2 d \operatorname{PolyLog}\left[3, \frac{\left(-c \sqrt{d} + \sqrt{e}\right) e^{2 i \operatorname{ArcTan}[c x]}}{c \sqrt{d} + \sqrt{e}}\right] - c^2 d \operatorname{PolyLog}\left[3, -\frac{\left(c \sqrt{d} + \sqrt{e}\right) e^{2 i \operatorname{ArcTan}[c x]}}{c \sqrt{d} - \sqrt{e}}\right]\Bigg)$$

Problem 1262: Unable to integrate problem.

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

Optimal (type 4, 554 leaves, 10 steps):

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

Result (type 8, 25 leaves):

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

Problem 1263: Result more than twice size of optimal antiderivative.

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

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

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

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

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

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

Result (type 4, 1527 leaves) :

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 1264: Unable to integrate problem.

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

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

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

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

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

Result (type 8, 22 leaves):

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

Problem 1265: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 637 leaves, 12 steps):

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

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

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

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

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

Result (type 4, 1410 leaves) :

$$\frac{1}{24\,d}\left(24\,a^2\,\text{Log}[x]-12\,a^2\,\text{Log}\left[d+e\,x^2\right]-24\,a\,b\left(-\mathrm{i}\,\text{ArcTan}[c\,x]^2+2\,\mathrm{i}\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\text{ArcTan}\left[\frac{c\,e\,x}{\sqrt{c^2\,d\,e}}\right]-2\,\text{ArcTan}[c\,x]\,\text{Log}\left[1-e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}\right]+\right.\right.$$

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

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

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

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

$$12\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[1+\frac{\left(c\,\sqrt{d}+\sqrt{e}\right)e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}}{c\,\sqrt{d}-\sqrt{e}}\right]+12\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[1+\frac{\left(c^2\,d+e-2\,\sqrt{c^2\,d\,e}\right)e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]+24\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]$$

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

$$24\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{-2\,\sqrt{c^2\,d\,e}\;e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}+e\left(-1+e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}\right)+c^2\,d\left(1+e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}\right)}{c^2\,d-e}\right]-$$

$$24\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[\frac{-2\,\sqrt{c^2\,d\,e}\;e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}+e\left(-1+e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}\right)+c^2\,d\left(1+e^{2\,\mathrm{i}\,\text{ArcTan}[c\,x]}\right)}{c^2\,d-e}\right]+24\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\text{ArcTan}[c\,x]$$

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

$$24\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\text{ArcTan}[c\,x]\,\text{Log}\left[1+\frac{\left(c^2\,d+e+2\,\sqrt{c^2\,d\,e}\right)\left(\text{Cos}[2\,\text{ArcTan}[c\,x]]+\mathrm{i}\,\text{Sin}[2\,\text{ArcTan}[c\,x]]\right)}{c^2\,d-e}\right]+$$

$$12\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[1+\frac{\left(c^2\,d+e+2\,\sqrt{c^2\,d\,e}\right)\left(\text{Cos}[2\,\text{ArcTan}[c\,x]]+\mathrm{i}\,\text{Sin}[2\,\text{ArcTan}[c\,x]]\right)}{c^2\,d-e}\right]+24\,\mathrm{i}\,\text{ArcTan}[c\,x]\,\text{PolyLog}\left[2,\,e^{-2\,\mathrm{i}\,\text{ArcTan}[c\,x]}\right]+$$

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

$$12\, \text{PolyLog}\left[3, e^{-2 i \text{ArcTan}[c x]}\right] - 6\, \text{PolyLog}\left[3, \frac{\left(-c\sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}+\sqrt{e}}\right] - 6\, \text{PolyLog}\left[3, -\frac{\left(c\sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}-\sqrt{e}}\right]\Bigg)\Bigg)$$

Problem 1266: Unable to integrate problem.

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

Optimal (type 4, 553 leaves, 9 steps):

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

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

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

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

Result (type 8, 25 leaves):

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

Problem 1267: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 745 leaves, 21 steps):

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

Result (type 4, 1555 leaves):

$$-\frac{1}{24 d^2}\left(\frac{12 a^2 d}{x^2}+\frac{24 a b c d}{x}+\frac{24 a b d \left(1+c^2 x^2\right) \text{ArcTan}[c x]}{x^2}+24 a^2 e \text{Log}[x]-\right.$$

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

$$\frac{1}{2 c^2 d-2 e} 48 a b \left(c^2 d-e\right) e \left(-i \text{ArcTan}[c x]^2+2 i \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d-e}}\right] \text{ArcTan}\left[\frac{c e x}{\sqrt{c^2 d e}}\right]+\right.$$

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

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

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

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

$$\left. 24 c^2 d \text{Log}\left[\frac{c x}{\sqrt{1 + c^2 x^2}}\right] + 24 i e \text{ArcTan}[c x] \text{PolyLog}\left[2, e^{-2 i \text{ArcTan}[c x]}\right] + 12 e \text{PolyLog}\left[3, e^{-2 i \text{ArcTan}[c x]}\right]\right) +$$

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

$$6 \text{ArcTan}[c x]^2 \text{Log}\left[1 + \frac{\left(c^2 d + e - 2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d - e}\right] + 12 \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d - e}}\right] \text{ArcTan}[c x]$$

$$\text{Log}\left[1 + \frac{\left(c^2 d + e + 2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d - e}\right] - 6 \text{ArcTan}[c x]^2 \text{Log}\left[1 + \frac{\left(c^2 d + e + 2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d - e}\right] -$$

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

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

$$\text{ArcTan}[c x] \text{Log}\left[\frac{2 i c^2 d - 2 i \sqrt{c^2 d e} + 2 c\left(-e + \sqrt{c^2 d e}\right) x}{\left(c^2 d - e\right)(i + c x)}\right] + 6 \text{ArcTan}[c x]^2 \text{Log}\left[\frac{2 i c^2 d - 2 i \sqrt{c^2 d e} + 2 c\left(-e + \sqrt{c^2 d e}\right) x}{\left(c^2 d - e\right)(i + c x)}\right] -$$

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

$$6 \text{ArcTan}[c x]^2 \text{Log}\left[1 + \frac{\left(c^2 d + e + 2\sqrt{c^2 d e}\right)\left(\text{Cos}[2 \text{ArcTan}[c x]] + i \text{Sin}[2 \text{ArcTan}[c x]]\right)}{c^2 d - e}\right] +$$

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

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

Problem 1268: Unable to integrate problem.

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

Optimal (type 4, 943 leaves, 33 steps):

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

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

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

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

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

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

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

Result (type 8, 25 leaves):

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

Problem 1269: Unable to integrate problem.

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

Optimal (type 4, 1033 leaves, 38 steps):

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

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

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

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

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

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

Result (type 8, 25 leaves):

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

Problem 1271: Unable to integrate problem.

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

Optimal (type 4, 1039 leaves, 32 steps):

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

Result (type 8, 22 leaves):

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

Problem 1272: Unable to integrate problem.

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

Optimal (type 4, 1087 leaves, 39 steps):

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

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

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

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

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

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

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

Result (type 8, 25 leaves) :

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

Problem 1273: Unable to integrate problem.

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

Optimal (type 4, 1141 leaves, 42 steps) :

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

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

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

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

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

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

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

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

Result (type 8, 25 leaves) :

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

Problem 1274: Unable to integrate problem.

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

Optimal (type 4, 1181 leaves, 47 steps) :

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

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

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

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

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

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

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

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

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

Result (type 8, 25 leaves) :

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

Problem 1281: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcTan}[x] \text{Log}[1+x^2]}{x^2} \, dx$$

Optimal (type 4, 41 leaves, 8 steps):

$$\text{ArcTan}[x]^2 - \frac{\text{ArcTan}[x] \text{Log}[1+x^2]}{x} - \frac{1}{4} \text{Log}[1+x^2]^2 - \frac{1}{2} \text{PolyLog}[2, -x^2]$$

Result (type 4, 190 leaves):

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

Problem 1283: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcTan}[x] \text{Log}[1+x^2]}{x^4} \, dx$$

Optimal (type 4, 81 leaves, 18 steps):

$$-\frac{2 \text{ArcTan}[x]}{3 x} - \frac{\text{ArcTan}[x]^2}{3} + \text{Log}[x] - \frac{1}{2} \text{Log}[1+x^2] - \frac{\text{Log}[1+x^2]}{6 x^2} - \frac{\text{ArcTan}[x] \text{Log}[1+x^2]}{3 x^3} + \frac{1}{12} \text{Log}[1+x^2]^2 + \frac{1}{6} \text{PolyLog}[2, -x^2]$$

Result (type 4, 238 leaves):

$$\frac{1}{12} \left(-\frac{8 \text{ArcTan}[x]}{x} - 4 \text{ArcTan}[x]^2 + 4 \text{Log}[x] + 4 \text{Log}[1 - i x] \text{Log}[x] + 4 \text{Log}[1 + i x] \text{Log}[x] - \text{Log}[-i + x]^2 - 2 \text{Log}[-i + x] \text{Log}\left[-\frac{1}{2} i (i + x)\right] - 2 \text{Log}\left[\frac{1}{2} (1 + i x)\right] \text{Log}[i + x] - \text{Log}[i + x]^2 + 8 \text{Log}\left[\frac{x}{\sqrt{1+x^2}}\right] - 2 \text{Log}[1+x^2] - \frac{2 \text{Log}[1+x^2]}{x^2} - \frac{4 \text{ArcTan}[x] \text{Log}[1+x^2]}{x^3} - 4 \text{Log}[x] \text{Log}[1+x^2] + 2 \text{Log}[-i + x] \text{Log}[1+x^2] + 2 \text{Log}[i + x] \text{Log}[1+x^2] - 2 \text{PolyLog}\left[2, \frac{1}{2} + \frac{i x}{2}\right] + 4 \text{PolyLog}[2, -i x] + 4 \text{PolyLog}[2, i x] - 2 \text{PolyLog}\left[2, -\frac{1}{2} i (i + x)\right]\right)$$

Problem 1285: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]}{x^6}\,dx$$

Optimal (type 4, 114 leaves, 26 steps):

$$-\frac{7}{60 x^2}-\frac{2\,\text{ArcTan}[x]}{15 x^3}+\frac{2\,\text{ArcTan}[x]}{5 x}+\frac{\text{ArcTan}[x]^2}{5}-\frac{5\,\text{Log}[x]}{6}+\frac{5}{12}\text{Log}\left[1+x^2\right]-\frac{\text{Log}\left[1+x^2\right]}{20 x^4}+\frac{\text{Log}\left[1+x^2\right]}{10 x^2}-\frac{\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]}{5 x^5}-\frac{1}{20}\text{Log}\left[1+x^2\right]^2-\frac{1}{10}\text{PolyLog}\left[2,-x^2\right]$$

Result (type 4, 315 leaves):

$$-\frac{1}{60 x^5}\left(7 x^3+4 x^5+8 x^2\,\text{ArcTan}[x]-24 x^4\,\text{ArcTan}[x]-12 x^5\,\text{ArcTan}[x]^2+18 x^5\,\text{Log}[x]+12 x^5\,\text{Log}[1-\text{i}\,x]\,\text{Log}[x]+12 x^5\,\text{Log}[1+\text{i}\,x]\,\text{Log}[x]-3 x^5\,\text{Log}[-\text{i}+x]^2-6 x^5\,\text{Log}[-\text{i}+x]\,\text{Log}\left[-\frac{1}{2}\text{i}\,(\text{i}+x)\right]-6 x^5\,\text{Log}\left[\frac{1}{2}(1+\text{i}\,x)\right]\text{Log}[\text{i}+x]-3 x^5\,\text{Log}[\text{i}+x]^2+32 x^5\,\text{Log}\left[\frac{x}{\sqrt{1+x^2}}\right]+3 x\,\text{Log}\left[1+x^2\right]-6 x^3\,\text{Log}\left[1+x^2\right]-9 x^5\,\text{Log}\left[1+x^2\right]+12\,\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]-12 x^5\,\text{Log}[x]\,\text{Log}\left[1+x^2\right]+6 x^5\,\text{Log}[-\text{i}+x]\,\text{Log}\left[1+x^2\right]+6 x^5\,\text{Log}[\text{i}+x]\,\text{Log}\left[1+x^2\right]-6 x^5\,\text{PolyLog}\left[2,\frac{1}{2}+\frac{\text{i}\,x}{2}\right]+12 x^5\,\text{PolyLog}[2,-\text{i}\,x]+12 x^5\,\text{PolyLog}[2,\text{i}\,x]-6 x^5\,\text{PolyLog}\left[2,-\frac{1}{2}\text{i}\,(\text{i}+x)\right]\right)$$

Problem 1291: Unable to integrate problem.

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

Optimal (type 4, 282 leaves, 18 steps):

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

Result (type 8, 28 leaves):

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

Problem 1292: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 100 leaves, 6 steps):

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

Result (type 4, 362 leaves):

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

Problem 1294: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 189 leaves, 15 steps):

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

Result (type 4, 420 leaves):

$$-\frac{1}{12 x^3}\left(4 a d+2 b c d x+4 b d \operatorname{ArcTan}[c x]+4 b c^3 d x^3 \operatorname{Log}[x]-2 b c^3 d x^3 \operatorname{Log}\left[1+c^2 x^2\right]+\right.$$
$$4 a e\left(2 c^2 x^2\left(1+c x \operatorname{ArcTan}[c x]\right)+\operatorname{Log}\left[1+c^2 x^2\right]\right)+b e\left(4 c^2 x^2\left(2 \operatorname{ArcTan}[c x]+c x \operatorname{ArcTan}[c x]^2-2 c x \operatorname{Log}\left[\frac{c x}{\sqrt{1+c^2 x^2}}\right]\right)-\right.$$
$$2 c^3 x^3\left(2 \operatorname{Log}[x]-\operatorname{Log}\left[1+c^2 x^2\right]\right)+2 \operatorname{Log}\left[1+c^2 x^2\right]\left(c x+2 \operatorname{ArcTan}[c x]+2 c^3 x^3 \operatorname{Log}[x]-c^3 x^3 \operatorname{Log}\left[1+c^2 x^2\right]\right)-$$
$$4 c^3 x^3\left(\operatorname{Log}[x]\left(\operatorname{Log}[1-i c x]+\operatorname{Log}[1+i c x]\right)+\operatorname{PolyLog}[2,-i c x]+\operatorname{PolyLog}[2, i c x]\right)+$$
$$c^3 x^3\left(\operatorname{Log}\left[-\frac{i}{c}+x\right]^2+\operatorname{Log}\left[\frac{i}{c}+x\right]^2-2\left(\operatorname{Log}\left[-\frac{i}{c}+x\right]+\operatorname{Log}\left[\frac{i}{c}+x\right]-\operatorname{Log}\left[1+c^2 x^2\right]\right) \operatorname{Log}\left[1+c^2 x^2\right]+\right.$$
$$\left.\left.\left.2\left(\operatorname{Log}\left[\frac{i}{c}+x\right] \operatorname{Log}\left[\frac{1}{2}(1+i c x)\right]+\operatorname{PolyLog}\left[2, \frac{1}{2}-\frac{i c x}{2}\right]\right)+2\left(\operatorname{Log}\left[-\frac{i}{c}+x\right] \operatorname{Log}\left[\frac{1}{2}(1-i c x)\right]+\operatorname{PolyLog}\left[2, \frac{1}{2}+\frac{i c x}{2}\right]\right)\right)\right)\right)$$

Problem 1296: Unable to integrate problem.

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

Optimal (type 4, 248 leaves, 24 steps):

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

Result (type 8, 28 leaves):

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

Problem 1297: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 562 leaves, 21 steps):

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

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

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

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

Result (type 4, 1138 leaves) :

$$\frac{1}{4\,c^2\,g}\Bigg(-2\,b\,c\,d\,g\,x+6\,b\,c\,e\,g\,x+2\,a\,c^2\,d\,g\,x^2-2\,a\,c^2\,e\,g\,x^2+2\,b\,d\,g\,\text{ArcTan}[c\,x]-2\,b\,e\,g\,\text{ArcTan}[c\,x]+2\,b\,c^2\,d\,g\,x^2\,\text{ArcTan}[c\,x]-$$

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

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

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

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

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

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

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

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

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

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

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

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

Problem 1298: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 656 leaves, 28 steps):

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

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

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

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

Result (type 4, 1362 leaves) :

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

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

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

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

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

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

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

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

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

Problem 1301: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 528 leaves, 22 steps):

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

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

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

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

Result (type 4, 1213 leaves):

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

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

$$4 b e g x^2 \text{ArcTan}[c x] \text{Log}\left[1-e^{2 i \text{ArcTan}[c x]}\right]+4 b c^2 e f x^2 \text{ArcTan}[c x] \text{Log}\left[1+e^{2 i \text{ArcTan}[c x]}\right]-$$

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

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

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

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

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

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

$$4 a e g x^2 \text{Log}[x]+2 a e f \text{Log}\left[f+g x^2\right]+2 b c e f x \text{Log}\left[f+g x^2\right]+2 a e g x^2 \text{Log}\left[f+g x^2\right]+2 b e f \text{ArcTan}[c x] \text{Log}\left[f+g x^2\right]+$$

$$2 b c^2 e f x^2 \text{ArcTan}[c x] \text{Log}\left[f+g x^2\right]-2 i b c^2 e f x^2 \text{PolyLog}\left[2,-e^{2 i \text{ArcTan}[c x]}\right]+2 i b e g x^2 \text{PolyLog}\left[2,e^{2 i \text{ArcTan}[c x]}\right]+$$

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

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

Test results for the 70 problems in "5.3.5 u (a+b arctan(c+d x))^p.m"

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

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

Optimal (type 4, 63 leaves, 5 steps):

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

Result (type 4, 189 leaves):

$$-\frac{1}{8\,d\,e}\Big(i\,b\,\pi^2 - 4\,i\,b\,\pi\,\text{ArcTan}[c + d\,x] + 8\,i\,b\,\text{ArcTan}[c + d\,x]^2 + b\,\pi\,\text{Log}[16] - 4\,b\,\pi\,\text{Log}\left[1 + e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] + 8\,b\,\text{ArcTan}[c + d\,x]\,\text{Log}\left[1 + e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] - 8\,b\,\text{ArcTan}[c + d\,x]\,\text{Log}\left[1 - e^{2\,i\,\text{ArcTan}[c+d\,x]}\right] - 8\,a\,\text{Log}[c + d\,x] - 2\,b\,\pi\,\text{Log}\left[1 + c^2 + 2\,c\,d\,x + d^2\,x^2\right] + 4\,i\,b\,\text{PolyLog}\left[2, -e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] + 4\,i\,b\,\text{PolyLog}\left[2, e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]\Big)$$

Problem 10: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 183 leaves, 8 steps):

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

Result (type 4, 381 leaves):

$$\frac{1}{24\,d\,e}\Big(-6\,i\,a\,b\,\pi^2 - i\,b^2\,\pi^3 + 24\,i\,a\,b\,\pi\,\text{ArcTan}[c + d\,x] - 48\,i\,a\,b\,\text{ArcTan}[c + d\,x]^2 + 16\,i\,b^2\,\text{ArcTan}[c + d\,x]^3 - a\,b\,\pi\,\text{Log}[16\,777\,216] + 24\,b^2\,\text{ArcTan}[c + d\,x]^2\,\text{Log}\left[1 - e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] + 24\,a\,b\,\pi\,\text{Log}\left[1 + e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] - 48\,a\,b\,\text{ArcTan}[c + d\,x]\,\text{Log}\left[1 + e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] + 48\,a\,b\,\text{ArcTan}[c + d\,x]\,\text{Log}\left[1 - e^{2\,i\,\text{ArcTan}[c+d\,x]}\right] - 24\,b^2\,\text{ArcTan}[c + d\,x]^2\,\text{Log}\left[1 + e^{2\,i\,\text{ArcTan}[c+d\,x]}\right] + 24\,a^2\,\text{Log}[c + d\,x] + 12\,a\,b\,\pi\,\text{Log}\left[1 + c^2 + 2\,c\,d\,x + d^2\,x^2\right] - 24\,i\,a\,b\,\text{PolyLog}\left[2, -e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] + 24\,i\,b^2\,\text{ArcTan}[c + d\,x]\,\text{PolyLog}\left[2, e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] + 24\,i\,b^2\,\text{ArcTan}[c + d\,x]\,\text{PolyLog}\left[2, -e^{2\,i\,\text{ArcTan}[c+d\,x]}\right] - 24\,i\,a\,b\,\text{PolyLog}\left[2, e^{2\,i\,\text{ArcTan}[c+d\,x]}\right] + 12\,b^2\,\text{PolyLog}\left[3, e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right] - 12\,b^2\,\text{PolyLog}\left[3, -e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]\Big)$$

Problem 17: Result more than twice size of optimal antiderivative.

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

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

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

Result (type 4, 562 leaves):

$$\frac{1}{64\,d\,e}\Big(64\,a^3\,\text{Log}[c+d\,x]-24\,i\,a^2\,b\,\big(\pi^2-4\,\pi\,\text{ArcTan}[c+d\,x]+8\,\text{ArcTan}[c+d\,x]^2-i\,\pi\,\text{Log}[16]+4\,i\,\pi\,\text{Log}\left[1+e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]-8\,i\,\text{ArcTan}[c+d\,x]\,\text{Log}\left[1+e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]+8\,i\,\text{ArcTan}[c+d\,x]\,\text{Log}\left[1-e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]+2\,i\,\pi\,\text{Log}\left[1+c^2+2\,c\,d\,x+d^2\,x^2\right]+4\,\text{PolyLog}\left[2,-e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]+4\,\text{PolyLog}\left[2,e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]\big)+8\,a\,b^2\,\big(-i\,\pi^3+16\,i\,\text{ArcTan}[c+d\,x]^3+24\,\text{ArcTan}[c+d\,x]^2\,\text{Log}\left[1-e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]-24\,\text{ArcTan}[c+d\,x]^2\,\text{Log}\left[1+e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]+24\,i\,\text{ArcTan}[c+d\,x]\,\text{PolyLog}\left[2,e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]+24\,i\,\text{ArcTan}[c+d\,x]\,\text{PolyLog}\left[2,-e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]+12\,\text{PolyLog}\left[3,e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]-12\,\text{PolyLog}\left[3,-e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]\big)-i\,b^3\,\big(\pi^4-32\,\text{ArcTan}[c+d\,x]^4+64\,i\,\text{ArcTan}[c+d\,x]^3\,\text{Log}\left[1-e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]-64\,i\,\text{ArcTan}[c+d\,x]^3\,\text{Log}\left[1+e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]-96\,\text{ArcTan}[c+d\,x]^2\,\text{PolyLog}\left[2,e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]-96\,\text{ArcTan}[c+d\,x]^2\,\text{PolyLog}\left[2,-e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]+96\,i\,\text{ArcTan}[c+d\,x]\,\text{PolyLog}\left[3,e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]-96\,i\,\text{ArcTan}[c+d\,x]\,\text{PolyLog}\left[3,-e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]+48\,\text{PolyLog}\left[4,e^{-2\,i\,\text{ArcTan}[c+d\,x]}\right]+48\,\text{PolyLog}\left[4,-e^{2\,i\,\text{ArcTan}[c+d\,x]}\right]\big)\Big)$$

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

$$\int \frac{\text{ArcTan}[1+x]}{2+2\,x}\,dx$$

Optimal (type 4, 31 leaves, 5 steps):

$$\frac{1}{4}\,i\,\text{PolyLog}[2,-i\,(1+x)]-\frac{1}{4}\,i\,\text{PolyLog}[2,i\,(1+x)]$$

Result (type 4, 138 leaves):

$$-\frac{1}{16}\,i\,\Big(\pi^2-4\,\pi\,\text{ArcTan}[1+x]+8\,\text{ArcTan}[1+x]^2-i\,\pi\,\text{Log}[16]+4\,i\,\pi\,\text{Log}\left[1+e^{-2\,i\,\text{ArcTan}[1+x]}\right]-8\,i\,\text{ArcTan}[1+x]\,\text{Log}\left[1+e^{-2\,i\,\text{ArcTan}[1+x]}\right]+8\,i\,\text{ArcTan}[1+x]\,\text{Log}\left[1-e^{2\,i\,\text{ArcTan}[1+x]}\right]+2\,i\,\pi\,\text{Log}\left[2+2\,x+x^2\right]+4\,\text{PolyLog}\left[2,-e^{-2\,i\,\text{ArcTan}[1+x]}\right]+4\,\text{PolyLog}\left[2,e^{2\,i\,\text{ArcTan}[1+x]}\right]\Big)$$

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

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

Optimal (type 4, 41 leaves, 5 steps):

$$\frac{i\, \text{PolyLog}[2, -i (a+b x)]}{2 d}-\frac{i\, \text{PolyLog}[2, i (a+b x)]}{2 d}$$

Result (type 4, 168 leaves):

$$-\frac{1}{8 d} i \left(\pi^2-4 \pi\, \text{ArcTan}[a+b x]+8\, \text{ArcTan}[a+b x]^2-i \pi\, \text{Log}[16]+4 i \pi\, \text{Log}\left[1+e^{-2 i \text{ArcTan}[a+b x]}\right]-8 i\, \text{ArcTan}[a+b x]\, \text{Log}\left[1+e^{-2 i \text{ArcTan}[a+b x]}\right]+ 8 i\, \text{ArcTan}[a+b x]\, \text{Log}\left[1-e^{2 i \text{ArcTan}[a+b x]}\right]+2 i \pi\, \text{Log}\left[1+a^2+2 a b x+b^2 x^2\right]+4\, \text{PolyLog}\left[2,-e^{-2 i \text{ArcTan}[a+b x]}\right]+4\, \text{PolyLog}\left[2, e^{2 i \text{ArcTan}[a+b x]}\right]\right)$$

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

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

Optimal (type 4, 382 leaves, 16 steps):

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

Result (type 4, 801 leaves):

$$a^2 e^2 x + a^2 e f x^2 + \frac{1}{3} a^2 f^2 x^3 + \frac{1}{3 d^3}$$

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

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

$$b^2 e f \left(\left(1 + 2 i c - c^2 + d^2 x^2\right) \text{ArcTan}[c + d x]^2 - 2 \text{ArcTan}[c + d x] \left(c + d x + 2 c \text{Log}\left[1 + e^{2 i \text{ArcTan}[c+d x]}\right]\right) + \text{Log}\left[1 + (c + d x)^2\right] + 2 i c \text{PolyLog}\left[2, -e^{2 i \text{ArcTan}[c+d x]}\right]\right) + \frac{1}{12 d^3} b^2 f^2 \left(1 + (c + d x)^2\right)^{3/2}$$

$$\left(\frac{c + d x}{\sqrt{1 + (c + d x)^2}} + \frac{6 c (c + d x) \text{ArcTan}[c + d x]}{\sqrt{1 + (c + d x)^2}} + \frac{3 (c + d x) \text{ArcTan}[c + d x]^2}{\sqrt{1 + (c + d x)^2}} + \frac{3 c^2 (c + d x) \text{ArcTan}[c + d x]^2}{\sqrt{1 + (c + d x)^2}} + i \text{ArcTan}[c + d x]^2\right.$$

$$\text{Cos}[3 \text{ArcTan}[c + d x]] - 3 i c^2 \text{ArcTan}[c + d x]^2 \text{Cos}[3 \text{ArcTan}[c + d x]] - 2 \text{ArcTan}[c + d x] \text{Cos}[3 \text{ArcTan}[c + d x]] \text{Log}\left[1 + e^{2 i \text{ArcTan}[c+d x]}\right] +$$

$$6 c^2 \text{ArcTan}[c + d x] \text{Cos}[3 \text{ArcTan}[c + d x]] \text{Log}\left[1 + e^{2 i \text{ArcTan}[c+d x]}\right] + 6 c \text{Cos}[3 \text{ArcTan}[c + d x]] \text{Log}\left[\frac{1}{\sqrt{1 + (c + d x)^2}}\right] + \frac{1}{\sqrt{1 + (c + d x)^2}}$$

$$\left(\left(3 i - 12 c - 9 i c^2\right) \text{ArcTan}[c + d x]^2 + 2 \text{ArcTan}[c + d x] \left(-2 + \left(-3 + 9 c^2\right) \text{Log}\left[1 + e^{2 i \text{ArcTan}[c+d x]}\right]\right) + 18 c \text{Log}\left[\frac{1}{\sqrt{1 + (c + d x)^2}}\right]\right) -$$

$$\frac{4 i \left(-1 + 3 c^2\right) \text{PolyLog}\left[2, -e^{2 i \text{ArcTan}[c+d x]}\right]}{\left(1 + (c + d x)^2\right)^{3/2}} + \text{Sin}[3 \text{ArcTan}[c + d x]] + 6 c \text{ArcTan}[c + d x] \text{Sin}[3 \text{ArcTan}[c + d x]] -$$

$$\left.\text{ArcTan}[c + d x]^2 \text{Sin}[3 \text{ArcTan}[c + d x]] + 3 c^2 \text{ArcTan}[c + d x]^2 \text{Sin}[3 \text{ArcTan}[c + d x]]\right)$$

Problem 34: Unable to integrate problem.

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

Optimal (type 4, 261 leaves, 2 steps):

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

Result (type 8, 22 leaves) :

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

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

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

Optimal (type 4, 564 leaves, 21 steps) :

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

Result (type 4, 1839 leaves) :

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

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

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

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

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

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

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

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

$$\frac{1}{d^2} b^3 e f \left(\text{ArcTan}[c+d x] \left(3 i \text{ArcTan}[c+d x]+2 i c \text{ArcTan}[c+d x]^2+\left(1+(c+d x)^2\right) \text{ArcTan}[c+d x]^2-\right.\right.$$

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

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

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

$$\frac{3 c^2 (c+d x) \text{ArcTan}[c+d x]^2}{\sqrt{1+(c+d x)^2}}+i \text{ArcTan}[c+d x]^2 \text{Cos}[3 \text{ArcTan}[c+d x]]-3 i c^2 \text{ArcTan}[c+d x]^2 \text{Cos}[3 \text{ArcTan}[c+d x]]-$$

$$2 \text{ArcTan}[c+d x] \text{Cos}[3 \text{ArcTan}[c+d x]] \text{Log}\left[1+e^{2 i \text{ArcTan}[c+d x]}\right]+6 c^2 \text{ArcTan}[c+d x] \text{Cos}[3 \text{ArcTan}[c+d x]] \text{Log}\left[1+e^{2 i \text{ArcTan}[c+d x]}\right]+$$

$$6 c \text{Cos}[3 \text{ArcTan}[c+d x]] \text{Log}\left[\frac{1}{\sqrt{1+(c+d x)^2}}\right]+\frac{1}{\sqrt{1+(c+d x)^2}}\left(\text{ArcTan}[c+d x] \left(-4+\left(3 i-12 c-9 i c^2\right) \text{ArcTan}[c+d x]\right)+\right.$$

$$\left.6 \left(-1+3 c^2\right) \text{ArcTan}[c+d x] \text{Log}\left[1+e^{2 i \text{ArcTan}[c+d x]}\right]+18 c \text{Log}\left[\frac{1}{\sqrt{1+(c+d x)^2}}\right]\right)-$$

$$\frac{4 i \left(-1+3 c^2\right) \text{PolyLog}\left[2,-e^{2 i \text{ArcTan}[c+d x]}\right]}{\left(1+(c+d x)^2\right)^{3/2}}+\text{Sin}[3 \text{ArcTan}[c+d x]]+6 c \text{ArcTan}[c+d x] \text{Sin}[3 \text{ArcTan}[c+d x]]-$$

$$\left.\text{ArcTan}[c+d x]^2 \text{Sin}[3 \text{ArcTan}[c+d x]]+3 c^2 \text{ArcTan}[c+d x]^2 \text{Sin}[3 \text{ArcTan}[c+d x]]\right)+$$

$$\frac{1}{d^3} b^3 f^2 \left(-i \left(3 c-\text{ArcTan}[c+d x]+3 c^2 \text{ArcTan}[c+d x]\right) \text{PolyLog}\left[2,-e^{2 i \text{ArcTan}[c+d x]}\right]+\frac{1}{12} \left(1+(c+d x)^2\right)^{3/2}\right.$$

$$\left(\frac{3 (c+d x) \text{ArcTan}[c+d x]}{\sqrt{1+(c+d x)^2}}+\frac{9 c (c+d x) \text{ArcTan}[c+d x]^2}{\sqrt{1+(c+d x)^2}}+\frac{3 (c+d x) \text{ArcTan}[c+d x]^3}{\sqrt{1+(c+d x)^2}}+\frac{3 c^2 (c+d x) \text{ArcTan}[c+d x]^3}{\sqrt{1+(c+d x)^2}}-\right.$$

$$9 i c \text{ArcTan}[c+d x]^2 \text{Cos}[3 \text{ArcTan}[c+d x]]+i \text{ArcTan}[c+d x]^3 \text{Cos}[3 \text{ArcTan}[c+d x]]-3 i c^2 \text{ArcTan}[c+d x]^3 \text{Cos}[3 \text{ArcTan}[c+d x]]+$$

$$18 c \text{ArcTan}[c+d x] \text{Cos}[3 \text{ArcTan}[c+d x]] \text{Log}\left[1+e^{2 i \text{ArcTan}[c+d x]}\right]-3 \text{ArcTan}[c+d x]^2 \text{Cos}[3 \text{ArcTan}[c+d x]] \text{Log}\left[1+e^{2 i \text{ArcTan}[c+d x]}\right]+$$

$$9 c^2 \text{ArcTan}[c+d x]^2 \text{Cos}[3 \text{ArcTan}[c+d x]] \text{Log}\left[1+e^{2 i \text{ArcTan}[c+d x]}\right]+3 \text{Cos}[3 \text{ArcTan}[c+d x]] \text{Log}\left[\frac{1}{\sqrt{1+(c+d x)^2}}\right]+$$

$$\frac{1}{\sqrt{1+(c+d x)^2}} 3 \left(\text{ArcTan}[c+d x]^2 \left(-2-9 i c+i \text{ArcTan}[c+d x]-4 c \text{ArcTan}[c+d x]-3 i c^2 \text{ArcTan}[c+d x]\right)+\right.$$

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

$$\frac{6 \left(-1+3 c^2\right) \text{PolyLog}\left[3,-e^{2 i \text{ArcTan}[c+d x]}\right]}{\left(1+(c+d x)^2\right)^{3/2}}+3 \text{ArcTan}[c+d x] \text{Sin}[3 \text{ArcTan}[c+d x]]+9 c \text{ArcTan}[c+d x]^2 \text{Sin}[3 \text{ArcTan}[c+d x]]-$$

$$\left.\left.\text{ArcTan}[c+d x]^3 \text{Sin}[3 \text{ArcTan}[c+d x]]+3 c^2 \text{ArcTan}[c+d x]^3 \text{Sin}[3 \text{ArcTan}[c+d x]]\right)\right)$$

Problem 39: Unable to integrate problem.

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

Optimal (type 4, 372 leaves, 2 steps):

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

Result (type 8, 22 leaves) :

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

Problem 40: Unable to integrate problem.

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

Optimal (type 4, 1233 leaves, 35 steps) :

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

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

$$\frac{6 a b^2 d \text{ArcTan}[c+d x] \text{Log}\left[\frac{2}{1-\mathrm{i} (c+d x)}\right]}{d^2 e^2-2 c d e f+\left(1+c^2\right) f^2}-\frac{3 b^3 d \text{ArcTan}[c+d x]^2 \text{Log}\left[\frac{2}{1-\mathrm{i} (c+d x)}\right]}{d^2 e^2-2 c d e f+\left(1+c^2\right) f^2}+\frac{6 a b^2 d \text{ArcTan}[c+d x] \text{Log}\left[\frac{2 d (e+f x)}{(d e+\mathrm{i} f-c f) (1-\mathrm{i} (c+d x))}\right]}{d^2 e^2-2 c d e f+\left(1+c^2\right) f^2}+$$

$$\frac{3 b^3 d \text{ArcTan}[c+d x]^2 \text{Log}\left[\frac{2 d (e+f x)}{(d e+\mathrm{i} f-c f) (1-\mathrm{i} (c+d x))}\right]}{d^2 e^2-2 c d e f+\left(1+c^2\right) f^2}+\frac{6 a b^2 d \text{ArcTan}[c+d x] \text{Log}\left[\frac{2}{1+\mathrm{i} (c+d x)}\right]}{d^2 e^2-2 c d e f+\left(1+c^2\right) f^2}+\frac{3 b^3 d \text{ArcTan}[c+d x]^2 \text{Log}\left[\frac{2}{1+\mathrm{i} (c+d x)}\right]}{d^2 e^2-2 c d e f+\left(1+c^2\right) f^2}-$$

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

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

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

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

Result (type 8, 22 leaves):

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

Problem 41: Unable to integrate problem.

$$\int \left(e+f x\right)^m \left(a+b \text{ArcTan}[c+d x]\right) dx$$

Optimal (type 5, 177 leaves, 6 steps):

$$\frac{\left(e+f x\right)^{1+m} \left(a+b \text{ArcTan}[c+d x]\right)}{f (1+m)}-\frac{\mathrm{i} b d \left(e+f x\right)^{2+m} \text{Hypergeometric2F1}\left[1,2+m,3+m,\frac{d (e+f x)}{d e+\mathrm{i} f-c f}\right]}{2 f \left(d e+\left(\mathrm{i}-c\right) f\right) (1+m) (2+m)}+$$

$$\frac{\mathrm{i} b d \left(e+f x\right)^{2+m} \text{Hypergeometric2F1}\left[1,2+m,3+m,\frac{d (e+f x)}{d e-(\mathrm{i}+c) f}\right]}{2 f \left(d e-\left(\mathrm{i}+c\right) f\right) (1+m) (2+m)}$$

Result (type 8, 20 leaves) :

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

Problem 52: Result is not expressed in closed-form.

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

Optimal (type 4, 863 leaves, 23 steps) :

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

Result (type 7, 892 leaves) :

$$-\frac{1}{6} b^2 \text{RootSum}\Big[b^3 c - i d + 3 a d + 3 i a^2 d - a^3 d + 3 b^3 c \#1 + 3 i d \#1 - 3 a d \#1 + 3 i a^2 d \#1 - 3 a^3 d \#1 + 3 b^3 c \#1^2 - 3 i d \#1^2 - 3 a d \#1^2 - 3 i a^2 d \#1^2 - 3 a^3 d \#1^2 + b^3 c \#1^3 + i d \#1^3 + 3 a d \#1^3 - 3 i a^2 d \#1^3 - a^3 d \#1^3 \&,$$

$$\Big(-\pi \text{ArcTan}[a+b x] - 2 \text{ArcTan}[a+b x]^2 + 2 i \text{ArcTan}[a+b x] \text{ArcTanh}\Big[\frac{-1+\#1}{1+\#1}\Big] + i \pi \text{Log}\Big[1+e^{-2 i \text{ArcTan}[a+b x]}\Big] +$$

$$2 i \text{ArcTan}[a+b x] \text{Log}\Big[1-e^{2 i \text{ArcTan}[a+b x]-2 \text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\Big] - 2 \text{ArcTanh}\Big[\frac{-1+\#1}{1+\#1}\Big] \text{Log}\Big[1-e^{2 i \text{ArcTan}[a+b x]-2 \text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\Big] -$$

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

$$2 \text{ArcTan}[a+b x]^2 \#1 + \pi \text{ArcTan}[a+b x] \#1^2 - 2 i \text{ArcTan}[a+b x] \text{ArcTanh}\Big[\frac{-1+\#1}{1+\#1}\Big] \#1^2 - i \pi \text{Log}\Big[1+e^{-2 i \text{ArcTan}[a+b x]}\Big] \#1^2 -$$

$$2 i \text{ArcTan}[a+b x] \text{Log}\Big[1-e^{2 i \text{ArcTan}[a+b x]-2 \text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\Big] \#1^2 + 2 \text{ArcTanh}\Big[\frac{-1+\#1}{1+\#1}\Big] \text{Log}\Big[1-e^{2 i \text{ArcTan}[a+b x]-2 \text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\Big] \#1^2 +$$

$$i \pi \text{Log}\Big[\frac{1}{\sqrt{1+(a+b x)^2}}\Big] \#1^2 - 2 \text{ArcTanh}\Big[\frac{-1+\#1}{1+\#1}\Big] \text{Log}\Big[\text{Sin}\Big[\text{ArcTan}[a+b x] + i \text{ArcTanh}\Big[\frac{-1+\#1}{1+\#1}\Big]\Big]\Big] \#1^2 -$$

$$\text{PolyLog}\Big[2, e^{2 i \text{ArcTan}[a+b x]-2 \text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\Big] \#1^2 + 2 e^{\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]} \text{ArcTan}[a+b x]^2 \sqrt{\frac{\#1}{(1+\#1)^2}} +$$

$$4 e^{\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]} \text{ArcTan}[a+b x]^2 \#1 \sqrt{\frac{\#1}{(1+\#1)^2}} + 2 e^{\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]} \text{ArcTan}[a+b x]^2 \#1^2 \sqrt{\frac{\#1}{(1+\#1)^2}}\Big) \Big/$$

$$\left(b^3 c + a d + 2 i a^2 d - a^3 d + 2 b^3 c \#1 - 2 a d \#1 - 2 a^3 d \#1 + b^3 c \#1^2 + a d \#1^2 - 2 i a^2 d \#1^2 - a^3 d \#1^2\right) \&\Big]$$

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

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

Optimal (type 4, 543 leaves, 17 steps):

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

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

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

Result (type 4, 1501 leaves):

$$\frac{1}{4\left(1+a^2\right)\sqrt{c}\,d}$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Optimal (type 4, 152 leaves, 5 steps):

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

Result (type 4, 305 leaves):

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

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

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

$$2\left(\text{ArcTan}\left[\frac{b\,c-a\,d}{d}\right]+\text{ArcTan}[a+b\,x]\right)\text{Log}\left[2\,\text{Sin}\left[\text{ArcTan}\left[\frac{b\,c-a\,d}{d}\right]+\text{ArcTan}[a+b\,x]\right]\right]-$$

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

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

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

Optimal (type 4, 244 leaves, 15 steps):

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

Result (type 4, 771 leaves):

$$\frac{1}{b c^2 (-2 a c + 2 b d)} \Bigg(-2 a^2 c^2 \text{ArcTan}[a + b x] + 2 a b c d \text{ArcTan}[a + b x] + i a b c d \pi \text{ArcTan}[a + b x] - i b^2 d^2 \pi \text{ArcTan}[a + b x] - 2 a b c^2 x \text{ArcTan}[a + b x] +$$

$$2 b^2 c d x \text{ArcTan}[a + b x] + 2 i a b c d \text{ArcTan}\left[a - \frac{b d}{c}\right] \text{ArcTan}[a + b x] - 2 i b^2 d^2 \text{ArcTan}\left[a - \frac{b d}{c}\right] \text{ArcTan}[a + b x] - b c d \text{ArcTan}[a + b x]^2 +$$

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

$$a b c d \pi \text{Log}\left[1 + e^{-2 i \text{ArcTan}[a+b x]}\right] - b^2 d^2 \pi \text{Log}\left[1 + e^{-2 i \text{ArcTan}[a+b x]}\right] - 2 a b c d \text{ArcTan}[a + b x] \text{Log}\left[1 + e^{2 i \text{ArcTan}[a+b x]}\right] +$$

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

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

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

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

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

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

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

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

Optimal (type 4, 668 leaves, 25 steps) :

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

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

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

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

Result (type 4, 1536 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 57: Result is not expressed in closed-form.

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

Optimal (type 4, 933 leaves, 31 steps) :

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

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

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

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

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

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

Result (type 7, 933 leaves) :

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

$$
b^3\,d\,\text{RootSum}\Big[\mathbb{i}\,c-3\,a\,c-3\,\mathbb{i}\,a^2\,c+a^3\,c-b^3\,d-3\,\mathbb{i}\,c\,\#1+3\,a\,c\,\#1-3\,\mathbb{i}\,a^2\,c\,\#1+3\,a^3\,c\,\#1-3\,b^3\,d\,\#1+
3\,\mathbb{i}\,c\,\#1^2+3\,a\,c\,\#1^2+3\,\mathbb{i}\,a^2\,c\,\#1^2+3\,a^3\,c\,\#1^2-3\,b^3\,d\,\#1^2-\mathbb{i}\,c\,\#1^3-3\,a\,c\,\#1^3+3\,\mathbb{i}\,a^2\,c\,\#1^3+a^3\,c\,\#1^3-b^3\,d\,\#1^3\,\&,
$$

$$
\Big(-\pi\,\text{ArcTan}[a+b\,x]-2\,\text{ArcTan}[a+b\,x]^2+2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]+\mathbb{i}\,\pi\,\text{Log}\left[1+\mathbb{e}^{-2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]}\right]+2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]
$$

$$
\text{Log}\left[1-\mathbb{e}^{2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]-2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\right]-2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]\,\text{Log}\left[1-\mathbb{e}^{2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]-2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\right]-\mathbb{i}\,\pi\,\text{Log}\left[\frac{1}{\sqrt{1+(a+b\,x)^2}}\right]+
$$

$$
2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]\,\text{Log}\left[\text{Sin}\left[\text{ArcTan}[a+b\,x]+\mathbb{i}\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]\right]\right]+\text{PolyLog}\left[2,\,\mathbb{e}^{2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]-2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\right]-
$$

$$
2\,\text{ArcTan}[a+b\,x]^2\,\#1+\pi\,\text{ArcTan}[a+b\,x]\,\#1^2-2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]\,\#1^2-\mathbb{i}\,\pi\,\text{Log}\left[1+\mathbb{e}^{-2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]}\right]\,\#1^2-
$$

$$
2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]\,\text{Log}\left[1-\mathbb{e}^{2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]-2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\right]\,\#1^2+2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]\,\text{Log}\left[1-\mathbb{e}^{2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]-2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\right]\,\#1^2+
$$

$$
\mathbb{i}\,\pi\,\text{Log}\left[\frac{1}{\sqrt{1+(a+b\,x)^2}}\right]\,\#1^2-2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]\,\text{Log}\left[\text{Sin}\left[\text{ArcTan}[a+b\,x]+\mathbb{i}\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]\right]\right]\,\#1^2-
$$

$$
\text{PolyLog}\left[2,\,\mathbb{e}^{2\,\mathbb{i}\,\text{ArcTan}[a+b\,x]-2\,\text{ArcTanh}\left[\frac{-1+\#1}{1+\#1}\right]}\right]\,\#1^2+2\,\mathbb{e}^{\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]}\,\text{ArcTan}[a+b\,x]^2\,\sqrt{\frac{\#1}{(1+\#1)^2}}+
$$

$$
4\,\mathbb{e}^{\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]}\,\text{ArcTan}[a+b\,x]^2\,\#1\,\sqrt{\frac{\#1}{(1+\#1)^2}}+2\,\mathbb{e}^{\text{ArcTanh}\left[\frac{1-\#1}{1+\#1}\right]}\,\text{ArcTan}[a+b\,x]^2\,\#1^2\,\sqrt{\frac{\#1}{(1+\#1)^2}}\Big)\Big/
$$

$$
\left.\left(-a\,c-2\,\mathbb{i}\,a^2\,c+a^3\,c-b^3\,d+2\,a\,c\,\#1+2\,a^3\,c\,\#1-2\,b^3\,d\,\#1-a\,c\,\#1^2+2\,\mathbb{i}\,a^2\,c\,\#1^2+a^3\,c\,\#1^2-b^3\,d\,\#1^2\right)\,\&\Big]\right)
$$

Problem 58: Result is not expressed in closed-form.

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

Optimal (type 4, 673 leaves, 31 steps):

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

Result (type 7, 303 leaves) :

$$\frac{1}{2\,d^2}\left(-\frac{4\,i\,\sqrt{-i+a}\;d\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,\sqrt{x}}{\sqrt{-i+a}}\right]}{\sqrt{b}}+\frac{4\,i\,\sqrt{i+a}\;d\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,\sqrt{x}}{\sqrt{i+a}}\right]}{\sqrt{b}}+4\,\mathrm{ArcTan}[a+b\,x]\left(d\,\sqrt{x}-c\,\mathrm{Log}\left[c+d\,\sqrt{x}\right]\right)+\right.$$
$$c\,d^2\,\mathrm{RootSum}\left[b^2\,c^4+2\,a\,b\,c^2\,d^2+d^4+a^2\,d^4-4\,b^2\,c^3\,\#1-4\,a\,b\,c\,d^2\,\#1+6\,b^2\,c^2\,\#1^2+2\,a\,b\,d^2\,\#1^2-4\,b^2\,c\,\#1^3+b^2\,\#1^4\,\&,\right.$$
$$\left.\left.\frac{-\mathrm{Log}\left[c+d\,\sqrt{x}\right]^2+2\,\mathrm{Log}\left[c+d\,\sqrt{x}\right]\mathrm{Log}\left[1-\frac{c+d\,\sqrt{x}}{\#1}\right]+2\,\mathrm{PolyLog}\left[2,\frac{c+d\,\sqrt{x}}{\#1}\right]}{b\,c^2+a\,d^2-2\,b\,c\,\#1+b\,\#1^2}\,\&\right]\right)$$

Problem 59: Unable to integrate problem.

$$\int\frac{\mathrm{ArcTan}[a+b\,x]}{c+\frac{d}{\sqrt{x}}}\,dx$$

Optimal (type 4, 770 leaves, 37 steps) :

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

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

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

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

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

Result (type 8, 20 leaves):

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

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

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

Optimal (type 4, 543 leaves, 17 steps):

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

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

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

Result (type 4, 1501 leaves):

$$\frac{1}{4\,\sqrt{a}\;b\,\left(1+d^2\right)}$$

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

$$2\sqrt{b}\,d^2\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(\mathrm{i}+d)}{\sqrt{a}\,e}\right]\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]-2\sqrt{a}\,e\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]^2+\sqrt{a}\,e\sqrt{\frac{b\,(-\mathrm{i}+d)^2+a\,e^2}{a\,e^2}}\;\mathrm{e}^{-\mathrm{i}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(-\mathrm{i}+d)}{\sqrt{a}\,e}\right]}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]^2-$$

$$\mathrm{i}\sqrt{a}\,d\,e\sqrt{\frac{b\,(-\mathrm{i}+d)^2+a\,e^2}{a\,e^2}}\;\mathrm{e}^{-\mathrm{i}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(-\mathrm{i}+d)}{\sqrt{a}\,e}\right]}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]^2+\sqrt{a}\,e\sqrt{\frac{b\,(\mathrm{i}+d)^2+a\,e^2}{a\,e^2}}\;\mathrm{e}^{-\mathrm{i}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(\mathrm{i}+d)}{\sqrt{a}\,e}\right]}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]^2+$$

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

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

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

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

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

$$2\,\mathrm{i}\sqrt{b}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(-\mathrm{i}+d)}{\sqrt{a}\,e}\right]\mathrm{Log}\left[-\mathrm{Sin}\left[\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(-\mathrm{i}+d)}{\sqrt{a}\,e}\right]+\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]\right]\right]-$$

$$2\,\mathrm{i}\sqrt{b}\,d^2\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(-\mathrm{i}+d)}{\sqrt{a}\,e}\right]\mathrm{Log}\left[-\mathrm{Sin}\left[\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(-\mathrm{i}+d)}{\sqrt{a}\,e}\right]+\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]\right]\right]+$$

$$2\,\mathrm{i}\sqrt{b}\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(\mathrm{i}+d)}{\sqrt{a}\,e}\right]\mathrm{Log}\left[-\mathrm{Sin}\left[\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(\mathrm{i}+d)}{\sqrt{a}\,e}\right]+\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]\right]\right]+$$

$$2\,\mathrm{i}\sqrt{b}\,d^2\,\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(\mathrm{i}+d)}{\sqrt{a}\,e}\right]\mathrm{Log}\left[-\mathrm{Sin}\left[\mathrm{ArcTan}\left[\frac{\sqrt{b}\,(\mathrm{i}+d)}{\sqrt{a}\,e}\right]+\mathrm{ArcTan}\left[\frac{\sqrt{b}\,x}{\sqrt{a}}\right]\right]\right]-$$

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

Problem 62: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 367 leaves, 12 steps):

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

Result (type 1, 1 leaves):

???

Test results for the 385 problems in "5.3.6 Exponentials of inverse tangent.m"

Problem 15: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{2 i \, \text{ArcTan}[a x]}}{x} \, dx$$

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

$$\text{Log}[x]-2 \, \text{Log}[i+a x]$$

Result (type 3, 29 leaves):

$$\text{Log}\left[1-e^{2 i \, \text{ArcTan}[a x]}\right]+\text{Log}\left[1+e^{2 i \, \text{ArcTan}[a x]}\right]$$

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

$$\int \frac{e^{-2 i \, \text{ArcTan}[a x]}}{x} \, dx$$

Optimal (type 3, 14 leaves, 3 steps):

$\text{Log}[x] - 2\,\text{Log}[i - a x]$

Result (type 3, 29 leaves):

$$\text{Log}\left[1 - e^{-2 i \text{ArcTan}[a x]}\right] + \text{Log}\left[1 + e^{-2 i \text{ArcTan}[a x]}\right]$$

Problem 61: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2} i \text{ArcTan}[a x]} x^2 \, dx$$

Optimal (type 3, 339 leaves, 15 steps):

$$-\frac{3 i (1 - i a x)^{3/4} (1 + i a x)^{1/4}}{8 a^3} - \frac{i (1 - i a x)^{3/4} (1 + i a x)^{5/4}}{12 a^3} + \frac{x (1 - i a x)^{3/4} (1 + i a x)^{5/4}}{3 a^2} + \frac{3 i \text{ArcTan}\left[1 - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{8 \sqrt{2} a^3} - \frac{3 i \text{ArcTan}\left[1 + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{8 \sqrt{2} a^3} - \frac{3 i \text{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{16 \sqrt{2} a^3} + \frac{3 i \text{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{16 \sqrt{2} a^3}$$

Result (type 7, 107 leaves):

$$-\frac{-\frac{8 i e^{\frac{1}{2} i \text{ArcTan}[a x]} \left(9+6 e^{2 i \text{ArcTan}[a x]}+29 e^{4 i \text{ArcTan}[a x]}\right)}{\left(1+e^{2 i \text{ArcTan}[a x]}\right)^3} + 9\,\text{RootSum}\left[1 + \#1^4 \&, \frac{\text{ArcTan}[a x] + 2 i \text{Log}\left[e^{\frac{1}{2} i \text{ArcTan}[a x]} - \#1\right]}{\#1^3} \&\right]}{96 a^3}$$

Problem 63: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2} i \text{ArcTan}[a x]} \, dx$$

Optimal (type 3, 268 leaves, 13 steps):

$$\frac{i (1 - i a x)^{3/4} (1 + i a x)^{1/4}}{a} - \frac{i \text{ArcTan}\left[1 - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{\sqrt{2} a} + \frac{i \text{ArcTan}\left[1 + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{\sqrt{2} a} + \frac{i \text{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{2 \sqrt{2} a} - \frac{i \text{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{2 \sqrt{2} a}$$

Result (type 7, 79 leaves):

$$-\frac{-\frac{8 i e^{\frac{1}{2} i \text{ArcTan}[a x]}}{1+e^{2 i \text{ArcTan}[a x]}} + \text{RootSum}\left[1 + \#1^4 \&, \frac{\text{ArcTan}[a x] + 2 i \text{Log}\left[e^{\frac{1}{2} i \text{ArcTan}[a x]} - \#1\right]}{\#1^3} \&\right]}{4 a}$$

Problem 71: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2} i \operatorname{ArcTan}[a x]} x^2 \, dx$$

Optimal (type 3, 339 leaves, 15 steps):

$$-\frac{17 i (1 - i a x)^{1/4} (1 + i a x)^{3/4}}{24 a^3} - \frac{i (1 - i a x)^{1/4} (1 + i a x)^{7/4}}{4 a^3} + \frac{x (1 - i a x)^{1/4} (1 + i a x)^{7/4}}{3 a^2} + \frac{17 i \operatorname{ArcTan}\left[1 - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{8 \sqrt{2} a^3} - \frac{17 i \operatorname{ArcTan}\left[1 + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{8 \sqrt{2} a^3} + \frac{17 i \operatorname{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{16 \sqrt{2} a^3} - \frac{17 i \operatorname{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{16 \sqrt{2} a^3}$$

Result (type 7, 107 leaves):

$$\frac{1}{96 a^3}\left(-\frac{8 i e^{\frac{3}{2} i \operatorname{ArcTan}[a x]} \left(17 + 30 e^{2 i \operatorname{ArcTan}[a x]} + 45 e^{4 i \operatorname{ArcTan}[a x]}\right)}{\left(1 + e^{2 i \operatorname{ArcTan}[a x]}\right)^3} + 51 \operatorname{RootSum}\left[1 + \#1^4 \&, \frac{\operatorname{ArcTan}[a x] + 2 i \operatorname{Log}\left[e^{\frac{1}{2} i \operatorname{ArcTan}[a x]} - \#1\right]}{\#1} \&\right]\right)$$

Problem 73: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2} i \operatorname{ArcTan}[a x]} \, dx$$

Optimal (type 3, 268 leaves, 13 steps):

$$\frac{i (1 - i a x)^{1/4} (1 + i a x)^{3/4}}{a} - \frac{3 i \operatorname{ArcTan}\left[1 - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{\sqrt{2} a} + \frac{3 i \operatorname{ArcTan}\left[1 + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{\sqrt{2} a} - \frac{3 i \operatorname{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{2 \sqrt{2} a} + \frac{3 i \operatorname{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{2 \sqrt{2} a}$$

Result (type 7, 82 leaves):

$$\frac{2 i e^{\frac{3}{2} i \operatorname{ArcTan}[a x]}}{a \left(1 + e^{2 i \operatorname{ArcTan}[a x]}\right)} - \frac{3 \operatorname{RootSum}\left[1 + \#1^4 \&, \frac{\operatorname{ArcTan}[a x] + 2 i \operatorname{Log}\left[e^{\frac{1}{2} i \operatorname{ArcTan}[a x]} - \#1\right]}{\#1} \&\right]}{4 a}$$

Problem 80: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2} i \operatorname{ArcTan}[a x]} x^2 \, dx$$

Optimal (type 3, 371 leaves, 16 steps):

$$\frac{55\,i\,(1-i\,a\,x)^{3/4}\,(1+i\,a\,x)^{1/4}}{8\,a^3}+\frac{11\,i\,(1-i\,a\,x)^{3/4}\,(1+i\,a\,x)^{5/4}}{4\,a^3}+\frac{2\,i\,(1+i\,a\,x)^{9/4}}{a^3\,(1-i\,a\,x)^{1/4}}+\frac{i\,(1-i\,a\,x)^{3/4}\,(1+i\,a\,x)^{9/4}}{3\,a^3}-$$
$$\frac{55\,i\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}+\frac{55\,i\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}+\frac{55\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}-\frac{55\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 120 leaves):

$$\frac{1}{a^3}\left(\frac{i\,e^{\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(165+462\,e^{2\,i\,\text{ArcTan}[a\,x]}+425\,e^{4\,i\,\text{ArcTan}[a\,x]}+96\,e^{6\,i\,\text{ArcTan}[a\,x]}\right)}{12\,\left(1+e^{2\,i\,\text{ArcTan}[a\,x]}\right)^3}-\frac{55}{32}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTan}[a\,x]+2\,i\,\text{Log}\left[e^{\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 82: Result is not expressed in closed-form.

$$\int e^{\frac{5}{2}\,i\,\text{ArcTan}[a\,x]}\,dx$$

Optimal (type 3, 299 leaves, 14 steps):

$$-\frac{5\,i\,(1-i\,a\,x)^{3/4}\,(1+i\,a\,x)^{1/4}}{a}-\frac{4\,i\,(1+i\,a\,x)^{5/4}}{a\,(1-i\,a\,x)^{1/4}}+\frac{5\,i\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{\sqrt{2}\,a}-$$
$$\frac{5\,i\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{\sqrt{2}\,a}-\frac{5\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}+\frac{5\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}$$

Result (type 7, 95 leaves):

$$\frac{-\frac{8\,i\,e^{\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(5+4\,e^{2\,i\,\text{ArcTan}[a\,x]}\right)}{1+e^{2\,i\,\text{ArcTan}[a\,x]}}+5\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTan}[a\,x]+2\,i\,\text{Log}\left[e^{\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]}{4\,a}$$

Problem 89: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 339 leaves, 15 steps):

$$\frac{3 i (1 - i a x)^{1/4} (1 + i a x)^{3/4}}{8 a^3} + \frac{i (1 - i a x)^{5/4} (1 + i a x)^{3/4}}{12 a^3} + \frac{x (1 - i a x)^{5/4} (1 + i a x)^{3/4}}{3 a^2} + \frac{3 i \text{ArcTan}\left[1 - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{8 \sqrt{2} a^3} - \frac{3 i \text{ArcTan}\left[1 + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{8 \sqrt{2} a^3} + \frac{3 i \text{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{16 \sqrt{2} a^3} - \frac{3 i \text{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{16 \sqrt{2} a^3}$$

Result (type 7, 107 leaves):

$$\frac{\frac{8 i e^{\frac{3}{2} i \text{ArcTan}[a x]} \left(29+6 e^{2 i \text{ArcTan}[a x]}+9 e^{4 i \text{ArcTan}[a x]}\right)}{\left(1+e^{2 i \text{ArcTan}[a x]}\right)^3} + 9 \text{RootSum}\left[1 + \#1^4 \&, \frac{\text{ArcTan}[a x] - 2 i \text{Log}\left[e^{-\frac{1}{2} i \text{ArcTan}[a x]} - \#1\right]}{\#1^3} \&\right]}{96 a^3}$$

Problem 91: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2} i \text{ArcTan}[a x]} \, dx$$

Optimal (type 3, 268 leaves, 13 steps):

$$-\frac{i (1 - i a x)^{1/4} (1 + i a x)^{3/4}}{a} - \frac{i \text{ArcTan}\left[1 - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{\sqrt{2} a} + \frac{i \text{ArcTan}\left[1 + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{\sqrt{2} a} - \frac{i \text{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} - \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{2 \sqrt{2} a} + \frac{i \text{Log}\left[1 + \frac{\sqrt{1-i a x}}{\sqrt{1+i a x}} + \frac{\sqrt{2} (1-i a x)^{1/4}}{(1+i a x)^{1/4}}\right]}{2 \sqrt{2} a}$$

Result (type 7, 81 leaves):

$$\frac{-\frac{8 i e^{\frac{3}{2} i \text{ArcTan}[a x]}}{1+e^{2 i \text{ArcTan}[a x]}} + \text{RootSum}\left[1 + \#1^4 \&, \frac{-\text{ArcTan}[a x] + 2 i \text{Log}\left[e^{-\frac{1}{2} i \text{ArcTan}[a x]} - \#1\right]}{\#1^3} \&\right]}{4 a}$$

Problem 98: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2} i \text{ArcTan}[a x]} x^2 \, dx$$

Optimal (type 3, 339 leaves, 15 steps):

$$\frac{17\,i\,(1-i\,a\,x)^{3/4}\,(1+i\,a\,x)^{1/4}}{24\,a^3}+\frac{i\,(1-i\,a\,x)^{7/4}\,(1+i\,a\,x)^{1/4}}{4\,a^3}+\frac{x\,(1-i\,a\,x)^{7/4}\,(1+i\,a\,x)^{1/4}}{3\,a^2}+\frac{17\,i\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-$$
$$\frac{17\,i\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-\frac{17\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}+\frac{17\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 107 leaves):

$$\frac{\frac{8\,i\,e^{\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(45+30\,e^{2\,i\,\text{ArcTan}[a\,x]}+17\,e^{4\,i\,\text{ArcTan}[a\,x]}\right)}{\left(1+e^{2\,i\,\text{ArcTan}[a\,x]}\right)^3}+51\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTan}[a\,x]-2\,i\,\text{Log}\left[e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{96\,a^3}$$

Problem 100: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\,i\,\text{ArcTan}[a\,x]}\,dx$$

Optimal (type 3, 268 leaves, 13 steps):

$$-\frac{i\,(1-i\,a\,x)^{3/4}\,(1+i\,a\,x)^{1/4}}{a}-\frac{3\,i\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{\sqrt{2}\,a}+$$
$$\frac{3\,i\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{\sqrt{2}\,a}+\frac{3\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}-\frac{3\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}$$

Result (type 7, 82 leaves):

$$-\frac{2\,i\,e^{-\frac{3}{2}\,i\,\text{ArcTan}[a\,x]}}{a\,\left(1+e^{-2\,i\,\text{ArcTan}[a\,x]}\right)}-\frac{3\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTan}[a\,x]-2\,i\,\text{Log}\left[e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}-\#1\right]}{\#1}\,\&\right]}{4\,a}$$

Problem 107: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\,i\,\text{ArcTan}[a\,x]}\,x^2\,dx$$

Optimal (type 3, 371 leaves, 16 steps):

$$-\frac{2\,i\,(1-i\,a\,x)^{9/4}}{a^3\,(1+i\,a\,x)^{1/4}}-\frac{55\,i\,(1-i\,a\,x)^{1/4}\,(1+i\,a\,x)^{3/4}}{8\,a^3}-\frac{11\,i\,(1-i\,a\,x)^{5/4}\,(1+i\,a\,x)^{3/4}}{4\,a^3}-\frac{i\,(1-i\,a\,x)^{9/4}\,(1+i\,a\,x)^{3/4}}{3\,a^3}-$$

$$\frac{55\,i\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}+\frac{55\,i\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{8\,\sqrt{2}\,a^3}-\frac{55\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}+\frac{55\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{16\,\sqrt{2}\,a^3}$$

Result (type 7, 120 leaves) :

$$\frac{1}{a^3}\left(-\frac{i\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\left(96+425\,e^{2\,i\,\text{ArcTan}[a\,x]}+462\,e^{4\,i\,\text{ArcTan}[a\,x]}+165\,e^{6\,i\,\text{ArcTan}[a\,x]}\right)}{12\,\left(1+e^{2\,i\,\text{ArcTan}[a\,x]}\right)^3}-\frac{55}{32}\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTan}[a\,x]-2\,i\,\text{Log}\left[e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]\right)$$

Problem 109: Result is not expressed in closed-form.

$$\int e^{-\frac{5}{2}\,i\,\text{ArcTan}[a\,x]}\,dx$$

Optimal (type 3, 299 leaves, 14 steps) :

$$\frac{4\,i\,(1-i\,a\,x)^{5/4}}{a\,(1+i\,a\,x)^{1/4}}+\frac{5\,i\,(1-i\,a\,x)^{1/4}\,(1+i\,a\,x)^{3/4}}{a}+\frac{5\,i\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{\sqrt{2}\,a}-$$

$$\frac{5\,i\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{\sqrt{2}\,a}+\frac{5\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}-\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}-\frac{5\,i\,\text{Log}\left[1+\frac{\sqrt{1-i\,a\,x}}{\sqrt{1+i\,a\,x}}+\frac{\sqrt{2}\,(1-i\,a\,x)^{1/4}}{(1+i\,a\,x)^{1/4}}\right]}{2\,\sqrt{2}\,a}$$

Result (type 7, 95 leaves) :

$$\frac{\frac{8\,i\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\left(4+5\,e^{2\,i\,\text{ArcTan}[a\,x]}\right)}{1+e^{2\,i\,\text{ArcTan}[a\,x]}}+5\,\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTan}[a\,x]-2\,i\,\text{Log}\left[e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}-\#1\right]}{\#1^3}\,\&\right]}{4\,a}$$

Problem 115: Result is not expressed in closed-form.

$$\int e^{\frac{1}{3}\,i\,\text{ArcTan}[x]}\,x^2\,dx$$

Optimal (type 3, 319 leaves, 16 steps) :

$$-\frac{19}{54}\,i\,(1-i x)^{5/6}(1+i x)^{1/6}-\frac{1}{18}\,i\,(1-i x)^{5/6}(1+i x)^{7/6}+\frac{1}{3}(1-i x)^{5/6}(1+i x)^{7/6}x+\frac{19}{162}\,i\,\text{ArcTan}\left[\sqrt{3}-\frac{2(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]-\frac{19}{162}\,i\,\text{ArcTan}\left[\sqrt{3}+\frac{2(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]-\frac{19}{81}\,i\,\text{ArcTan}\left[\frac{(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]-\frac{19\,i\,\text{Log}\left[1+\frac{(1-i x)^{1/3}}{(1+i x)^{1/3}}-\frac{\sqrt{3}(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]}{108\sqrt{3}}+\frac{19\,i\,\text{Log}\left[1+\frac{(1-i x)^{1/3}}{(1+i x)^{1/3}}+\frac{\sqrt{3}(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]}{108\sqrt{3}}$$

Result (type 7, 156 leaves) :

$$\frac{1}{486}\left(-6\,i\left(\frac{3\,e^{\frac{1}{3} i \text{ArcTan}[x]}\left(19+8\,e^{2 i \text{ArcTan}[x]}+61\,e^{4 i \text{ArcTan}[x]}\right)}{\left(1+e^{2 i \text{ArcTan}[x]}\right)^3}-19\,\text{ArcTan}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}\right]\right)-19\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\frac{-2\,\text{ArcTan}[x]-6\,i\,\text{Log}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}-\#1\right]+\text{ArcTan}[x]\,\#1^2+3\,i\,\text{Log}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}-\#1\right]\#1^2}{-\#1+2\,\#1^3}\,\&\right]\right)$$

Problem 117: Result is not expressed in closed-form.

$$\int e^{\frac{1}{3} i \text{ArcTan}[x]}\,dx$$

Optimal (type 3, 262 leaves, 14 steps) :

$$i\,(1-i x)^{5/6}(1+i x)^{1/6}-\frac{1}{3}\,i\,\text{ArcTan}\left[\sqrt{3}-\frac{2(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]+\frac{1}{3}\,i\,\text{ArcTan}\left[\sqrt{3}+\frac{2(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]+\frac{2}{3}\,i\,\text{ArcTan}\left[\frac{(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]+\frac{i\,\text{Log}\left[1+\frac{(1-i x)^{1/3}}{(1+i x)^{1/3}}-\frac{\sqrt{3}(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]}{2\sqrt{3}}-\frac{i\,\text{Log}\left[1+\frac{(1-i x)^{1/3}}{(1+i x)^{1/3}}+\frac{\sqrt{3}(1-i x)^{1/6}}{(1+i x)^{1/6}}\right]}{2\sqrt{3}}$$

Result (type 7, 133 leaves) :

$$\frac{2\,i\,e^{\frac{1}{3} i \text{ArcTan}[x]}}{1+e^{2 i \text{ArcTan}[x]}}-\frac{2}{3}\,i\,\text{ArcTan}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}\right]+\frac{1}{9}\,\text{RootSum}\left[1-\#1^2+\#1^4\,\&,\frac{-2\,\text{ArcTan}[x]-6\,i\,\text{Log}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}-\#1\right]+\text{ArcTan}[x]\,\#1^2+3\,i\,\text{Log}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}-\#1\right]\#1^2}{-\#1+2\,\#1^3}\,\&\right]$$

Problem 122: Result is not expressed in closed-form.

$$\int e^{\frac{2}{3} i \text{ArcTan}[x]}\,x^2\,dx$$

Optimal (type 3, 177 leaves, 5 steps) :

$$-\frac{11}{27} i (1-i x)^{2/3} (1+i x)^{1/3}-\frac{1}{9} i (1-i x)^{2/3} (1+i x)^{4/3}+$$

$$\frac{1}{3} (1-i x)^{2/3} (1+i x)^{4/3} x+\frac{22 i \text{ArcTan}\left[\frac{1}{\sqrt{3}}-\frac{2 (1-i x)^{1/3}}{\sqrt{3} (1+i x)^{1/3}}\right]}{27 \sqrt{3}}+\frac{11}{27} i \text{Log}\left[1+\frac{(1-i x)^{1/3}}{(1+i x)^{1/3}}\right]+\frac{11}{81} i \text{Log}[1+i x]$$

Result (type 7, 154 leaves):

$$\frac{2}{243} \left(-\frac{9 i e^{\frac{2}{3} i \text{ArcTan}[x]} \left(11+10 e^{2 i \text{ArcTan}[x]}+35 e^{4 i \text{ArcTan}[x]}\right)}{\left(1+e^{2 i \text{ArcTan}[x]}\right)^3}+22 \text{ArcTan}[x]+33 i \text{Log}\left[1+e^{\frac{2}{3} i \text{ArcTan}[x]}\right]+\right.$$

$$\left.11 \text{RootSum}\left[1-\#1^2+\#1^4 \&,\frac{\text{ArcTan}[x]+3 i \text{Log}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}-\#1\right]+\text{ArcTan}[x] \#1^2+3 i \text{Log}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}-\#1\right] \#1^2}{-2+\#1^2}\&\right]\right)$$

Problem 124: Result is not expressed in closed-form.

$$\int e^{\frac{2}{3} i \text{ArcTan}[x]} \, dx$$

Optimal (type 3, 116 leaves, 3 steps):

$$i (1-i x)^{2/3} (1+i x)^{1/3}-\frac{2 i \text{ArcTan}\left[\frac{1}{\sqrt{3}}-\frac{2 (1-i x)^{1/3}}{\sqrt{3} (1+i x)^{1/3}}\right]}{\sqrt{3}}-i \text{Log}\left[1+\frac{(1-i x)^{1/3}}{(1+i x)^{1/3}}\right]-\frac{1}{3} i \text{Log}[1+i x]$$

Result (type 7, 134 leaves):

$$\frac{2 i e^{\frac{2}{3} i \text{ArcTan}[x]}}{1+e^{2 i \text{ArcTan}[x]}}-\frac{4 \text{ArcTan}[x]}{9}-\frac{2}{3} i \text{Log}\left[1+e^{\frac{2}{3} i \text{ArcTan}[x]}\right]-$$

$$\frac{2}{9} \text{RootSum}\left[1-\#1^2+\#1^4 \&,\frac{\text{ArcTan}[x]+3 i \text{Log}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}-\#1\right]+\text{ArcTan}[x] \#1^2+3 i \text{Log}\left[e^{\frac{1}{3} i \text{ArcTan}[x]}-\#1\right] \#1^2}{-2+\#1^2}\&\right]$$

Problem 128: Result is not expressed in closed-form.

$$\int e^{\frac{1}{4} i \text{ArcTan}[a x]} x^2 \, dx$$

Optimal (type 3, 741 leaves, 27 steps):

$$-\frac{11\,i\,(1-i a x)^{7/8}(1+i a x)^{1/8}}{32 a^3}-\frac{i\,(1-i a x)^{7/8}(1+i a x)^{9/8}}{24 a^3}+\frac{x\,(1-i a x)^{7/8}(1+i a x)^{9/8}}{3 a^2}+\frac{11\,i\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{128 a^3}+$$

$$\frac{11\,i\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{128 a^3}-\frac{11\,i\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{128 a^3}-\frac{11\,i\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{128 a^3}-$$

$$\frac{11\,i\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{256 a^3}+\frac{11\,i\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{256 a^3}-$$

$$\frac{11\,i\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{256 a^3}+\frac{11\,i\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{256 a^3}$$

Result (type 7, 108 leaves):

$$\frac{1}{a^3}\left(-\frac{i\,e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\left(33+10\,e^{2 i\,\text{ArcTan}[a x]}+105\,e^{4 i\,\text{ArcTan}[a x]}\right)}{48\left(1+e^{2 i\,\text{ArcTan}[a x]}\right)^3}+\frac{11}{512}\,\text{RootSum}\left[1+\#1^8\,\&,\ \frac{\text{ArcTan}[a x]+4\,i\,\text{Log}\left[e^{\frac{1}{4} i\,\text{ArcTan}[a x]}-\#1\right]}{\#1^7}\,\&\right]\right)$$

Problem 129: Result is not expressed in closed-form.

$$\int e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\,x\,dx$$

Optimal (type 3, 689 leaves, 26 steps):

$$\frac{(1-i a x)^{7/8}(1+i a x)^{1/8}}{8 a^2}+\frac{(1-i a x)^{7/8}(1+i a x)^{9/8}}{2 a^2}-\frac{\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{32 a^2}-\frac{\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{32 a^2}+$$

$$\frac{\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{32 a^2}+\frac{\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{32 a^2}+\frac{\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{64 a^2}-$$

$$\frac{\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{64 a^2}+\frac{\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{64 a^2}-\frac{\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{64 a^2}$$

Result (type 7, 138 leaves):

$$\frac{1}{128 a^2}\left(\frac{32\, e^{\frac{1}{4} i \text{ArcTan}[a x]}\left(1+9\, e^{2 i \text{ArcTan}[a x]}\right)}{\left(1+e^{2 i \text{ArcTan}[a x]}\right)^2}+\text{RootSum}\left[-i+\#1^4\&,\frac{\text{ArcTan}[a x]+4 i \text{Log}\left[e^{\frac{1}{4} i \text{ArcTan}[a x]}-\#1\right]}{\#1^3}\&\right]-\text{RootSum}\left[i+\#1^4\&,\frac{\text{ArcTan}[a x]+4 i \text{Log}\left[e^{\frac{1}{4} i \text{ArcTan}[a x]}-\#1\right]}{\#1^3}\&\right]\right)$$

Problem 130: Result is not expressed in closed-form.

$$\int e^{\frac{1}{4} i \text{ArcTan}[a x]}\, dx$$

Optimal (type 3, 674 leaves, 25 steps):

$$\frac{i(1-i a x)^{7/8}(1+i a x)^{1/8}}{a}-\frac{i\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{4 a}-\frac{i\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{4 a}+\frac{i\sqrt{2+\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]}{4 a}+\frac{i\sqrt{2-\sqrt{2}}\,\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]}{4 a}+\frac{i\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{8 a}-\frac{i\sqrt{2-\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{8 a}+\frac{i\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{8 a}-\frac{i\sqrt{2+\sqrt{2}}\,\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]}{8 a}$$

Result (type 7, 79 leaves):

$$-\frac{-\frac{32 i e^{\frac{1}{4} i \text{ArcTan}[a x]}}{1+e^{2 i \text{ArcTan}[a x]}}+\text{RootSum}\left[1+\#1^8\&,\frac{\text{ArcTan}[a x]+4 i \text{Log}\left[e^{\frac{1}{4} i \text{ArcTan}[a x]}-\#1\right]}{\#1^7}\&\right]}{16 a}$$

Problem 131: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{4} i \text{ArcTan}[a x]}}{x}\, dx$$

Optimal (type 3, 859 leaves, 39 steps):

$$-2\,\text{ArcTan}\left[\frac{(1+i a x)^{1/8}}{(1-i a x)^{1/8}}\right]+\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}-\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]+\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}-\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]-$$

$$\sqrt{2+\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2-\sqrt{2}}+\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2+\sqrt{2}}}\right]-\sqrt{2-\sqrt{2}}\;\text{ArcTan}\left[\frac{\sqrt{2+\sqrt{2}}+\frac{2(1-i a x)^{1/8}}{(1+i a x)^{1/8}}}{\sqrt{2-\sqrt{2}}}\right]+\sqrt{2}\;\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1+i a x)^{1/8}}{(1-i a x)^{1/8}}\right]-$$

$$\sqrt{2}\;\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1+i a x)^{1/8}}{(1-i a x)^{1/8}}\right]-2\,\text{ArcTanh}\left[\frac{(1+i a x)^{1/8}}{(1-i a x)^{1/8}}\right]-\frac{1}{2}\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}-\frac{\sqrt{2-\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]+$$

$$\frac{1}{2}\sqrt{2-\sqrt{2}}\;\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}+\frac{\sqrt{2-\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]-\frac{1}{2}\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}-\frac{\sqrt{2+\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]+$$

$$\frac{1}{2}\sqrt{2+\sqrt{2}}\;\text{Log}\left[1+\frac{(1-i a x)^{1/4}}{(1+i a x)^{1/4}}+\frac{\sqrt{2+\sqrt{2}}\,(1-i a x)^{1/8}}{(1+i a x)^{1/8}}\right]+\frac{\text{Log}\left[1-\frac{\sqrt{2}\,(1+i a x)^{1/8}}{(1-i a x)^{1/8}}+\frac{(1+i a x)^{1/4}}{(1-i a x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{2}\,(1+i a x)^{1/8}}{(1-i a x)^{1/8}}+\frac{(1+i a x)^{1/4}}{(1-i a x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 252 leaves) :

$$-2\,\text{ArcTan}\left[e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\right]+\text{Log}\left[1-e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\right]+(-1)^{1/4}\,\text{Log}\left[(-1)^{1/4}-e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\right]+(-1)^{3/4}\,\text{Log}\left[(-1)^{3/4}-e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\right]-$$

$$\text{Log}\left[1+e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\right]-(-1)^{1/4}\,\text{Log}\left[(-1)^{1/4}+e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\right]-(-1)^{3/4}\,\text{Log}\left[(-1)^{3/4}+e^{\frac{1}{4} i\,\text{ArcTan}[a x]}\right]+$$

$$\frac{1}{4}\,\text{RootSum}\left[-i+\#1^4\,\&,\;\frac{-\text{ArcTan}[a x]-4\,i\,\text{Log}\left[e^{\frac{1}{4} i\,\text{ArcTan}[a x]}-\#1\right]}{\#1^3}\,\&\right]+\frac{1}{4}\,\text{RootSum}\left[i+\#1^4\,\&,\;\frac{\text{ArcTan}[a x]+4\,i\,\text{Log}\left[e^{\frac{1}{4} i\,\text{ArcTan}[a x]}-\#1\right]}{\#1^3}\,\&\right]$$

Problem 132: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{4} i\,\text{ArcTan}[a x]}}{x^2}\,dx$$

Optimal (type 3, 328 leaves, 16 steps) :

$$-\frac{(1-i a x)^{7/8}\,(1+i a x)^{1/8}}{x}-\frac{1}{2}\,i\,a\,\text{ArcTan}\left[\frac{(1+i a x)^{1/8}}{(1-i a x)^{1/8}}\right]+\frac{i\,a\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1+i a x)^{1/8}}{(1-i a x)^{1/8}}\right]}{2\sqrt{2}}-\frac{i\,a\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1+i a x)^{1/8}}{(1-i a x)^{1/8}}\right]}{2\sqrt{2}}-$$

$$\frac{1}{2}\,i\,a\,\text{ArcTanh}\left[\frac{(1+i a x)^{1/8}}{(1-i a x)^{1/8}}\right]+\frac{i\,a\,\text{Log}\left[1-\frac{\sqrt{2}\,(1+i a x)^{1/8}}{(1-i a x)^{1/8}}+\frac{(1+i a x)^{1/4}}{(1-i a x)^{1/4}}\right]}{4\sqrt{2}}-\frac{i\,a\,\text{Log}\left[1+\frac{\sqrt{2}\,(1+i a x)^{1/8}}{(1-i a x)^{1/8}}+\frac{(1+i a x)^{1/4}}{(1-i a x)^{1/4}}\right]}{4\sqrt{2}}$$

Result (type 7, 131 leaves) :

$$\frac{1}{16} a \left(-4 i \left(\frac{8 e^{\frac{1}{4} i \text{ArcTan}[a x]}}{-1+e^{2 i \text{ArcTan}[a x]}}+2 \text{ArcTan}\left[e^{\frac{1}{4} i \text{ArcTan}[a x]}\right]-\text{Log}\left[1-e^{\frac{1}{4} i \text{ArcTan}[a x]}\right]+\text{Log}\left[1+e^{\frac{1}{4} i \text{ArcTan}[a x]}\right]\right)-\right.$$
$$\left.\text{RootSum}\left[1+\#1^4 \&, \frac{\text{ArcTan}[a x]+4 i \text{Log}\left[e^{\frac{1}{4} i \text{ArcTan}[a x]}-\#1\right]}{\#1^3} \&\right]\right)$$

Problem 140: Result unnecessarily involves higher level functions.

$$\int e^{3 i \text{ArcTan}[a x]} x^m \, dx$$

Optimal (type 5, 159 leaves, 9 steps):

$$-\frac{3 x^{1+m} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, -a^2 x^2\right]}{1+m}-\frac{i a x^{2+m} \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, -a^2 x^2\right]}{2+m}+$$
$$\frac{4 x^{1+m} \text{Hypergeometric2F1}\left[\frac{3}{2}, \frac{1+m}{2}, \frac{3+m}{2}, -a^2 x^2\right]}{1+m}+\frac{4 i a x^{2+m} \text{Hypergeometric2F1}\left[\frac{3}{2}, \frac{2+m}{2}, \frac{4+m}{2}, -a^2 x^2\right]}{2+m}$$

Result (type 6, 315 leaves):

$$\frac{1}{(1+m)\,(i+a x)^{3/2}}$$
$$2\,(2+m)\,x^{1+m} \sqrt{-i+a x}\,\left(-\left(\left(2\,\text{AppellF1}\left[1+m, -\frac{1}{2}, \frac{3}{2}, 2+m, -i a x, i a x\right]\right)\Big/\left(2\,(2+m)\,\text{AppellF1}\left[1+m, -\frac{1}{2}, \frac{3}{2}, 2+m, -i a x, i a x\right]+\right.\right.\right.$$
$$\left.\left.i a x \left(3\,\text{AppellF1}\left[2+m, -\frac{1}{2}, \frac{5}{2}, 3+m, -i a x, i a x\right]+\text{AppellF1}\left[2+m, \frac{1}{2}, \frac{3}{2}, 3+m, -i a x, i a x\right]\right)\right)\right)-$$
$$\left(i \sqrt{1-i a x}\,\sqrt{1+a^2 x^2}\,\text{AppellF1}\left[1+m, -\frac{1}{2}, \frac{1}{2}, 2+m, -i a x, i a x\right]\right)\Big/\left(\sqrt{1+i a x}\,\left(-2 i\,(2+m)\,\text{AppellF1}\left[1+m, -\frac{1}{2}, \frac{1}{2}, 2+m, -i a x, i a x\right]+\right.\right.$$
$$\left.\left.\left.a x \left(\text{AppellF1}\left[2+m, -\frac{1}{2}, \frac{3}{2}, 3+m, -i a x, i a x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2}, 1+\frac{m}{2}\right\}, \left\{2+\frac{m}{2}\right\}, -a^2 x^2\right]\right)\right)\right)\right)$$

Problem 141: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int e^{i \text{ArcTan}[a x]} x^m \, dx$$

Optimal (type 5, 79 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},-a^2x^2\right]}{1+m}+\frac{i\,a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},-a^2x^2\right]}{2+m}$$

Result (type 6, 193 leaves):

$$\left(2\,i\,(2+m)\,x^{1+m}\sqrt{1-i\,a\,x}\,\sqrt{-i+a\,x}\,\sqrt{1+a^2x^2}\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-i\,a\,x,i\,a\,x\right]\right)\Big/$$
$$\left((1+m)\sqrt{1+i\,a\,x}\,(i+a\,x)^{3/2}\left(-2\,i\,(2+m)\,\text{AppellF1}\left[1+m,-\frac{1}{2},\frac{1}{2},2+m,-i\,a\,x,i\,a\,x\right]+\right.\right.$$
$$\left.\left.a\,x\left(\text{AppellF1}\left[2+m,-\frac{1}{2},\frac{3}{2},3+m,-i\,a\,x,i\,a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},-a^2x^2\right]\right)\right)\right)$$

Problem 142: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int e^{-i\,\text{ArcTan}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 79 leaves, 4 steps):

$$\frac{x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},-a^2x^2\right]}{1+m}-\frac{i\,a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},-a^2x^2\right]}{2+m}$$

Result (type 6, 193 leaves):

$$-\left(\left(2\,i\,(2+m)\,x^{1+m}\sqrt{1+i\,a\,x}\,\sqrt{i+a\,x}\,\sqrt{1+a^2x^2}\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,-i\,a\,x,i\,a\,x\right]\right)\Big/\right.$$
$$\left((1+m)\sqrt{1-i\,a\,x}\,(-i+a\,x)^{3/2}\left(2\,i\,(2+m)\,\text{AppellF1}\left[1+m,\frac{1}{2},-\frac{1}{2},2+m,-i\,a\,x,i\,a\,x\right]+\right.\right.$$
$$\left.\left.\left.a\,x\left(\text{AppellF1}\left[2+m,\frac{3}{2},-\frac{1}{2},3+m,-i\,a\,x,i\,a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},1+\frac{m}{2}\right\},\left\{2+\frac{m}{2}\right\},-a^2x^2\right]\right)\right)\right)\right)$$

Problem 143: Result unnecessarily involves higher level functions.

$$\int e^{-3\,i\,\text{ArcTan}[a\,x]}\,x^m\,dx$$

Optimal (type 5, 159 leaves, 9 steps):

$$-\frac{3\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},-a^2x^2\right]}{1+m}+\frac{i\,a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},-a^2x^2\right]}{2+m}+$$
$$\frac{4\,x^{1+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{1+m}{2},\frac{3+m}{2},-a^2x^2\right]}{1+m}-\frac{4\,i\,a\,x^{2+m}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{2+m}{2},\frac{4+m}{2},-a^2x^2\right]}{2+m}$$

Result (type 6, 315 leaves):

$$\frac{1}{(1+m)\ (-\mathrm{i}+a\,x)^{3/2}} 2\ (2+m)\ x^{1+m}\sqrt{\mathrm{i}+a\,x}\ \left(-\left(\left(2\,\text{AppellF1}\left[1+m,\ \frac{3}{2},\ -\frac{1}{2},\ 2+m,\ -\mathrm{i}\,a\,x,\ \mathrm{i}\,a\,x\right]\right)\Big/\left(2\ (2+m)\ \text{AppellF1}\left[1+m,\ \frac{3}{2},\ -\frac{1}{2},\ 2+m,\ -\mathrm{i}\,a\,x,\ \mathrm{i}\,a\,x\right]-\mathrm{i}\,a\,x\left(\text{AppellF1}\left[2+m,\ \frac{3}{2},\ \frac{1}{2},\ 3+m,\ -\mathrm{i}\,a\,x,\ \mathrm{i}\,a\,x\right]+3\,\text{AppellF1}\left[2+m,\ \frac{5}{2},\ -\frac{1}{2},\ 3+m,\ -\mathrm{i}\,a\,x,\ \mathrm{i}\,a\,x\right]\right)\right)\right)+\left(\mathrm{i}\sqrt{1+\mathrm{i}\,a\,x}\ \sqrt{1+a^2\,x^2}\ \text{AppellF1}\left[1+m,\ \frac{1}{2},\ -\frac{1}{2},\ 2+m,\ -\mathrm{i}\,a\,x,\ \mathrm{i}\,a\,x\right]\right)\Big/\left(\sqrt{1-\mathrm{i}\,a\,x}\ \left(2\,\mathrm{i}\ (2+m)\ \text{AppellF1}\left[1+m,\ \frac{1}{2},\ -\frac{1}{2},\ 2+m,\ -\mathrm{i}\,a\,x,\ \mathrm{i}\,a\,x\right]+a\,x\left(\text{AppellF1}\left[2+m,\ \frac{3}{2},\ -\frac{1}{2},\ 3+m,\ -\mathrm{i}\,a\,x,\ \mathrm{i}\,a\,x\right]+\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\ 1+\frac{m}{2}\right\},\ \left\{2+\frac{m}{2}\right\},\ -a^2\,x^2\right]\right)\right)\right)\right)$$

Problem 144: Unable to integrate problem.

$$\int e^{\frac{5}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 36 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\ \frac{5}{4},\ -\frac{5}{4},\ 2+m,\ \mathrm{i}\,a\,x,\ -\mathrm{i}\,a\,x\right]}{1+m}$$

Result (type 8, 18 leaves):

$$\int e^{\frac{5}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,x^m\,dx$$

Problem 145: Unable to integrate problem.

$$\int e^{\frac{3}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,x^m\,dx$$

Optimal (type 6, 36 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\ \frac{3}{4},\ -\frac{3}{4},\ 2+m,\ \mathrm{i}\,a\,x,\ -\mathrm{i}\,a\,x\right]}{1+m}$$

Result (type 8, 18 leaves):

$$\int e^{\frac{3}{2}\mathrm{i}\,\text{ArcTan}[a\,x]}\,x^m\,dx$$

Problem 146: Unable to integrate problem.

$$\int e^{\frac{1}{2} i \operatorname{ArcTan}[a x]} x^m \, dx$$

Optimal (type 6, 36 leaves, 2 steps):

$$\frac{x^{1+m} \operatorname{AppellF1}\left[1+m, \frac{1}{4}, -\frac{1}{4}, 2+m, i a x, -i a x\right]}{1+m}$$

Result (type 8, 18 leaves):

$$\int e^{\frac{1}{2} i \operatorname{ArcTan}[a x]} x^m \, dx$$

Problem 147: Unable to integrate problem.

$$\int e^{-\frac{1}{2} i \operatorname{ArcTan}[a x]} x^m \, dx$$

Optimal (type 6, 36 leaves, 2 steps):

$$\frac{x^{1+m} \operatorname{AppellF1}\left[1+m, -\frac{1}{4}, \frac{1}{4}, 2+m, i a x, -i a x\right]}{1+m}$$

Result (type 8, 18 leaves):

$$\int e^{-\frac{1}{2} i \operatorname{ArcTan}[a x]} x^m \, dx$$

Problem 148: Unable to integrate problem.

$$\int e^{-\frac{3}{2} i \operatorname{ArcTan}[a x]} x^m \, dx$$

Optimal (type 6, 36 leaves, 2 steps):

$$\frac{x^{1+m} \operatorname{AppellF1}\left[1+m, -\frac{3}{4}, \frac{3}{4}, 2+m, i a x, -i a x\right]}{1+m}$$

Result (type 8, 18 leaves):

$$\int e^{-\frac{3}{2} i \operatorname{ArcTan}[a x]} x^m \, dx$$

Problem 149: Unable to integrate problem.

$$\int e^{-\frac{5}{2} i \text{ArcTan}[a x]} x^m \, dx$$

Optimal (type 6, 36 leaves, 2 steps):

$$\frac{x^{1+m} \text{AppellF1}\left[1+m, -\frac{5}{4}, \frac{5}{4}, 2+m, i a x, -i a x\right]}{1+m}$$

Result (type 8, 18 leaves):

$$\int e^{-\frac{5}{2} i \text{ArcTan}[a x]} x^m \, dx$$

Problem 150: Unable to integrate problem.

$$\int e^{\frac{2 \text{ArcTan}[x]}{3}} x^m \, dx$$

Optimal (type 6, 38 leaves, 2 steps):

$$\frac{x^{1+m} \text{AppellF1}\left[1+m, -\frac{i}{3}, \frac{i}{3}, 2+m, i x, -i x\right]}{1+m}$$

Result (type 8, 14 leaves):

$$\int e^{\frac{2 \text{ArcTan}[x]}{3}} x^m \, dx$$

Problem 151: Unable to integrate problem.

$$\int e^{\frac{\text{ArcTan}[x]}{3}} x^m \, dx$$

Optimal (type 6, 38 leaves, 2 steps):

$$\frac{x^{1+m} \text{AppellF1}\left[1+m, -\frac{i}{6}, \frac{i}{6}, 2+m, i x, -i x\right]}{1+m}$$

Result (type 8, 14 leaves):

$$\int e^{\frac{\text{ArcTan}[x]}{3}} x^m \, dx$$

Problem 152: Unable to integrate problem.

$$\int e^{\frac{1}{4} i \operatorname{ArcTan}[a x]} x^m \, dx$$

Optimal (type 6, 36 leaves, 2 steps):

$$\frac{x^{1+m} \operatorname{AppellF1}\left[1+m, \frac{1}{8}, -\frac{1}{8}, 2+m, i a x, -i a x\right]}{1+m}$$

Result (type 8, 18 leaves):

$$\int e^{\frac{1}{4} i \operatorname{ArcTan}[a x]} x^m \, dx$$

Problem 153: Unable to integrate problem.

$$\int e^{i n \operatorname{ArcTan}[a x]} x^m \, dx$$

Optimal (type 6, 40 leaves, 2 steps):

$$\frac{x^{1+m} \operatorname{AppellF1}\left[1+m, \frac{n}{2}, -\frac{n}{2}, 2+m, i a x, -i a x\right]}{1+m}$$

Result (type 8, 17 leaves):

$$\int e^{i n \operatorname{ArcTan}[a x]} x^m \, dx$$

Problem 176: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{2 i \operatorname{ArcTan}[a+b x]}}{x} \, dx$$

Optimal (type 3, 38 leaves, 3 steps):

$$\frac{(i-a) \operatorname{Log}[x]}{i+a} - \frac{2 \operatorname{Log}[i+a+b x]}{1-i a}$$

Result (type 3, 125 leaves):

$$\frac{1}{2\,(\mathrm{i}+a)}\left((2+2\,\mathrm{i}\,a)\,\text{ArcTan}\left[\frac{2\,a}{-1+e^{2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}+a^2\,\left(1+e^{2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\right)}\right]+\right.$$
$$\left.2\,(\mathrm{i}+a)\,\text{Log}\left[1+e^{2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\right]-(-\mathrm{i}+a)\,\text{Log}\left[\left(-1+e^{2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\right)^2+a^2\,\left(1+e^{2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\right)^2\right]\right)$$

Problem 203: Result more than twice size of optimal antiderivative.

$$\int \frac{e^{-2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}}{x}\,dx$$

Optimal (type 3, 41 leaves, 3 steps):

$$\frac{(\mathrm{i}+a)\,\text{Log}[x]}{\mathrm{i}-a}-\frac{2\,\text{Log}[\mathrm{i}-a-b\,x]}{1+\mathrm{i}\,a}$$

Result (type 3, 138 leaves):

$$\frac{1}{2\,(-\mathrm{i}+a)}\left((2-2\,\mathrm{i}\,a)\,\text{ArcTan}\left[\frac{2\,a}{-1+e^{-2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}+a^2\,\left(1+e^{-2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\right)}\right]+\right.$$
$$\left.2\,(-\mathrm{i}+a)\,\text{Log}\left[1+e^{-2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\right]-(\mathrm{i}+a)\,\text{Log}\left[e^{-4\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\,\left(\left(-1+e^{2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\right)^2+a^2\,\left(1+e^{2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\right)^2\right)\right]\right)$$

Problem 218: Result is not expressed in closed-form.

$$\int e^{\frac{1}{2}\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}\,dx$$

Optimal (type 3, 338 leaves, 13 steps):

$$\frac{\mathrm{i}\,(1-\mathrm{i}\,a-\mathrm{i}\,b\,x)^{3/4}\,(1+\mathrm{i}\,a+\mathrm{i}\,b\,x)^{1/4}}{b}-\frac{\mathrm{i}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-\mathrm{i}\,a-\mathrm{i}\,b\,x)^{1/4}}{(1+\mathrm{i}\,a+\mathrm{i}\,b\,x)^{1/4}}\right]}{\sqrt{2}\,b}+$$
$$\frac{\mathrm{i}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-\mathrm{i}\,a-\mathrm{i}\,b\,x)^{1/4}}{(1+\mathrm{i}\,a+\mathrm{i}\,b\,x)^{1/4}}\right]}{\sqrt{2}\,b}+\frac{\mathrm{i}\,\text{Log}\left[1+\frac{\sqrt{1-\mathrm{i}\,a-\mathrm{i}\,b\,x}}{\sqrt{1+\mathrm{i}\,a+\mathrm{i}\,b\,x}}-\frac{\sqrt{2}\,(1-\mathrm{i}\,a-\mathrm{i}\,b\,x)^{1/4}}{(1+\mathrm{i}\,a+\mathrm{i}\,b\,x)^{1/4}}\right]}{2\,\sqrt{2}\,b}-\frac{\mathrm{i}\,\text{Log}\left[1+\frac{\sqrt{1-\mathrm{i}\,a-\mathrm{i}\,b\,x}}{\sqrt{1+\mathrm{i}\,a+\mathrm{i}\,b\,x}}+\frac{\sqrt{2}\,(1-\mathrm{i}\,a-\mathrm{i}\,b\,x)^{1/4}}{(1+\mathrm{i}\,a+\mathrm{i}\,b\,x)^{1/4}}\right]}{2\,\sqrt{2}\,b}$$

Result (type 7, 87 leaves):

$$-\frac{-\frac{8\,\mathrm{i}\,e^{\frac{1}{2}\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}}{1+e^{2\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}}+\text{RootSum}\left[1+\#1^4\,\&,\,\frac{\text{ArcTan}[a+b\,x]+2\,\mathrm{i}\,\text{Log}\left[e^{\frac{1}{2}\,\mathrm{i}\,\text{ArcTan}[a+b\,x]}-\#1\right]}{\#1^3}\,\&\right]}{4\,b}$$

Problem 219: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}}{x} \, dx$$

Optimal (type 3, 395 leaves, 15 steps):

$$-\frac{2 (i-a)^{1/4} \operatorname{ArcTan}\left[\frac{(i+a)^{1/4} (1+i (a+b x))^{1/4}}{(i-a)^{1/4} (1-i (a+b x))^{1/4}}\right]}{(i+a)^{1/4}}-\sqrt{2} \operatorname{ArcTan}\left[1-\frac{\sqrt{2} (1+i (a+b x))^{1/4}}{(1-i (a+b x))^{1/4}}\right]+\sqrt{2} \operatorname{ArcTan}\left[1+\frac{\sqrt{2} (1+i (a+b x))^{1/4}}{(1-i (a+b x))^{1/4}}\right]-\frac{2 (i-a)^{1/4} \operatorname{ArcTanh}\left[\frac{(i+a)^{1/4} (1+i (a+b x))^{1/4}}{(i-a)^{1/4} (1-i (a+b x))^{1/4}}\right]}{(i+a)^{1/4}}-\frac{\operatorname{Log}\left[1-\frac{\sqrt{2} (1+i (a+b x))^{1/4}}{(1-i (a+b x))^{1/4}}+\frac{\sqrt{1+i (a+b x)}}{\sqrt{1-i (a+b x)}}\right]}{\sqrt{2}}+\frac{\operatorname{Log}\left[1+\frac{\sqrt{2} (1+i (a+b x))^{1/4}}{(1-i (a+b x))^{1/4}}+\frac{\sqrt{1+i (a+b x)}}{\sqrt{1-i (a+b x)}}\right]}{\sqrt{2}}$$

Result (type 7, 184 leaves):

$$(-1)^{1/4} \left(-\operatorname{Log}\left[(-1)^{1/4}-e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}\right]-i \operatorname{Log}\left[(-1)^{3/4}-e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}\right]+\operatorname{Log}\left[(-1)^{1/4}+e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}\right]+i \operatorname{Log}\left[(-1)^{3/4}+e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}\right]\right)+\frac{(1+i a) \operatorname{RootSum}\left[-i+a+i \#1^4+a \#1^4 \&, \frac{\operatorname{ArcTan}[a+b x]+i \operatorname{Log}\left[\left(e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}-\#1\right)^2\right]}{\#1^3} \&\right]}{2 (i+a)}$$

Problem 220: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}}{x^2} \, dx$$

Optimal (type 3, 205 leaves, 6 steps):

$$-\frac{(i+a+b x) (1+i (a+b x))^{1/4}}{(i+a) x (1-i (a+b x))^{1/4}}+\frac{i b \operatorname{ArcTan}\left[\frac{(i+a)^{1/4} (1+i (a+b x))^{1/4}}{(i-a)^{1/4} (1-i (a+b x))^{1/4}}\right]}{(i-a)^{3/4} (i+a)^{5/4}}+\frac{i b \operatorname{ArcTanh}\left[\frac{(i+a)^{1/4} (1+i (a+b x))^{1/4}}{(i-a)^{1/4} (1-i (a+b x))^{1/4}}\right]}{(i-a)^{3/4} (i+a)^{5/4}}$$

Result (type 7, 131 leaves):

$$-\frac{1}{4 (i+a)^2} b \left(\frac{8 (i+a) e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}}{1-e^{2 i \operatorname{ArcTan}[a+b x]}+i a \left(1+e^{2 i \operatorname{ArcTan}[a+b x]}\right)}+\operatorname{RootSum}\left[-i+a+i \#1^4+a \#1^4 \&, \frac{\operatorname{ArcTan}[a+b x]+i \operatorname{Log}\left[\left(e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}-\#1\right)^2\right]}{\#1^3} \&\right]\right)$$

Problem 223: Result is not expressed in closed-form.

$$\int e^{\frac{3}{2} i \operatorname{ArcTan}[a+b x]} \, dx$$

Optimal (type 3, 338 leaves, 13 steps):

$$\frac{i (1-i a-i b x)^{1/4} (1+i a+i b x)^{3/4}}{b}-\frac{3 i \operatorname{ArcTan}\left[1-\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2}\, b}+\frac{3 i \operatorname{ArcTan}\left[1+\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2}\, b}-\frac{3 i \operatorname{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}-\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{2 \sqrt{2}\, b}+\frac{3 i \operatorname{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}+\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{2 \sqrt{2}\, b}$$

Result (type 7, 90 leaves):

$$\frac{2 i e^{\frac{3}{2} i \operatorname{ArcTan}[a+b x]}}{b \left(1+e^{2 i \operatorname{ArcTan}[a+b x]}\right)}-\frac{3 \operatorname{RootSum}\left[1+\#1^4 \&, \frac{\operatorname{ArcTan}[a+b x]+2 i \operatorname{Log}\left[e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}-\#1\right]}{\#1} \&\right]}{4 b}$$

Problem 224: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{3}{2} i \operatorname{ArcTan}[a+b x]}}{x} \, dx$$

Optimal (type 3, 427 leaves, 18 steps):

$$\frac{2 (i-a)^{3/4} \operatorname{ArcTan}\left[\frac{(i+a)^{1/4} (1+i a+i b x)^{1/4}}{(i-a)^{1/4} (1-i a-i b x)^{1/4}}\right]}{(i+a)^{3/4}}+\sqrt{2} \operatorname{ArcTan}\left[1-\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]-\sqrt{2} \operatorname{ArcTan}\left[1+\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]-\frac{2 (i-a)^{3/4} \operatorname{ArcTanh}\left[\frac{(i+a)^{1/4} (1+i a+i b x)^{1/4}}{(i-a)^{1/4} (1-i a-i b x)^{1/4}}\right]}{(i+a)^{3/4}}+\frac{\operatorname{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}-\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2}}-\frac{\operatorname{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}+\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 184 leaves):

$$(-1)^{1/4} \left(-i \operatorname{Log}\left[(-1)^{1/4}-e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}\right]-\operatorname{Log}\left[(-1)^{3/4}-e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}\right]+i \operatorname{Log}\left[(-1)^{1/4}+e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}\right]+\operatorname{Log}\left[(-1)^{3/4}+e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}\right]\right)+\frac{(1+i a) \operatorname{RootSum}\left[-i+a+i \#1^4+a \#1^4 \&, \frac{\operatorname{ArcTan}[a+b x]+i \operatorname{Log}\left[\left(e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}-\#1\right)^2\right]}{\#1} \&\right]}{2 (i+a)}$$

Problem 225: Result is not expressed in closed-form.

$$\int \frac{e^{\frac{3}{2} i \text{ArcTan}[a+b x]}}{x^2} \, dx$$

Optimal (type 3, 211 leaves, 6 steps):

$$-\frac{(1-i a-i b x)^{1/4} (1+i a+i b x)^{3/4}}{(1-i a) x}-\frac{3 i b \text{ArcTan}\left[\frac{(i+a)^{1/4} (1+i a+i b x)^{1/4}}{(i-a)^{1/4} (1-i a-i b x)^{1/4}}\right]}{(i-a)^{1/4} (i+a)^{7/4}}+\frac{3 i b \text{ArcTanh}\left[\frac{(i+a)^{1/4} (1+i a+i b x)^{1/4}}{(i-a)^{1/4} (1-i a-i b x)^{1/4}}\right]}{(i-a)^{1/4} (i+a)^{7/4}}$$

Result (type 7, 131 leaves):

$$\frac{1}{4 (i+a)^2} b \left(\frac{8 (i+a) e^{\frac{3}{2} i \text{ArcTan}[a+b x]}}{-1+e^{2 i \text{ArcTan}[a+b x]}-i a \left(1+e^{2 i \text{ArcTan}[a+b x]}\right)}-3 \text{RootSum}\left[-i+a+i \#1^4+a \#1^4 \&, \frac{\text{ArcTan}[a+b x]+i \text{Log}\left[\left(e^{\frac{1}{2} i \text{ArcTan}[a+b x]}-\#1\right)^2\right]}{\#1} \&\right]\right)$$

Problem 228: Result is not expressed in closed-form.

$$\int e^{-\frac{1}{2} i \text{ArcTan}[a+b x]} \, dx$$

Optimal (type 3, 338 leaves, 13 steps):

$$-\frac{i (1-i a-i b x)^{1/4} (1+i a+i b x)^{3/4}}{b}-\frac{i \text{ArcTan}\left[1-\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2} b}+$$
$$\frac{i \text{ArcTan}\left[1+\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2} b}-\frac{i \text{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}-\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{2 \sqrt{2} b}+\frac{i \text{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}+\frac{\sqrt{2} (1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{2 \sqrt{2} b}$$

Result (type 7, 89 leaves):

$$\frac{-\frac{8 i e^{\frac{3}{2} i \text{ArcTan}[a+b x]}}{1+e^{2 i \text{ArcTan}[a+b x]}}+\text{RootSum}\left[1+\#1^4 \&, \frac{-\text{ArcTan}[a+b x]+2 i \text{Log}\left[e^{-\frac{1}{2} i \text{ArcTan}[a+b x]}-\#1\right]}{\#1^3} \&\right]}{4 b}$$

Problem 229: Result is not expressed in closed-form.

$$\int \frac{e^{-\frac{1}{2} i \text{ArcTan}[a+b x]}}{x} \, dx$$

Optimal (type 3, 395 leaves, 14 steps):

$$-\frac{2\,(i+a)^{1/4}\,\text{ArcTan}\left[\frac{(i-a)^{1/4}\,(1-i\,(a+b\,x))^{1/4}}{(i+a)^{1/4}\,(1+i\,(a+b\,x))^{1/4}}\right]}{(i-a)^{1/4}}-\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i\,(a+b\,x))^{1/4}}{(1+i\,(a+b\,x))^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i\,(a+b\,x))^{1/4}}{(1+i\,(a+b\,x))^{1/4}}\right]-\frac{2\,(i+a)^{1/4}\,\text{ArcTanh}\left[\frac{(i-a)^{1/4}\,(1-i\,(a+b\,x))^{1/4}}{(i+a)^{1/4}\,(1+i\,(a+b\,x))^{1/4}}\right]}{(i-a)^{1/4}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-i\,(a+b\,x)}}{\sqrt{1+i\,(a+b\,x)}}-\frac{\sqrt{2}\,(1-i\,(a+b\,x))^{1/4}}{(1+i\,(a+b\,x))^{1/4}}\right]}{\sqrt{2}}+\frac{\text{Log}\left[1+\frac{\sqrt{1-i\,(a+b\,x)}}{\sqrt{1+i\,(a+b\,x)}}+\frac{\sqrt{2}\,(1-i\,(a+b\,x))^{1/4}}{(1+i\,(a+b\,x))^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 236 leaves):

$$(-1)^{1/4}\left(i\,\text{Log}\left[e^{-2\,i\,\text{ArcTan}[a+b\,x]}\left((-1)^{1/4}-e^{\frac{1}{2}\,i\,\text{ArcTan}[a+b\,x]}\right)\right]+\text{Log}\left[e^{-2\,i\,\text{ArcTan}[a+b\,x]}\left((-1)^{3/4}-e^{\frac{1}{2}\,i\,\text{ArcTan}[a+b\,x]}\right)\right]-i\,\text{Log}\left[e^{-2\,i\,\text{ArcTan}[a+b\,x]}\left((-1)^{1/4}+e^{\frac{1}{2}\,i\,\text{ArcTan}[a+b\,x]}\right)\right]-\text{Log}\left[e^{-2\,i\,\text{ArcTan}[a+b\,x]}\left((-1)^{3/4}+e^{\frac{1}{2}\,i\,\text{ArcTan}[a+b\,x]}\right)\right]\right)+\frac{(1-i\,a)\,\text{RootSum}\left[i+a-i\,\#1^4+a\,\#1^4\,\&,\ \frac{\text{ArcTan}[a+b\,x]-i\,\text{Log}\left[\left(e^{-\frac{1}{2}\,i\,\text{ArcTan}[a+b\,x]}-\#1\right)^2\right]}{\#1^3}\,\&\right]}{2\,(-i+a)}$$

Problem 230: Result is not expressed in closed-form.

$$\int \frac{e^{-\frac{1}{2}\,i\,\text{ArcTan}[a+b\,x]}}{x^2}\,dx$$

Optimal (type 3, 210 leaves, 5 steps):

$$-\frac{(i-a-b\,x)\,(1-i\,(a+b\,x))^{1/4}}{(i-a)\,x\,(1+i\,(a+b\,x))^{1/4}}-\frac{i\,b\,\text{ArcTan}\left[\frac{(i-a)^{1/4}\,(1-i\,(a+b\,x))^{1/4}}{(i+a)^{1/4}\,(1+i\,(a+b\,x))^{1/4}}\right]}{(i-a)^{5/4}\,(i+a)^{3/4}}-\frac{i\,b\,\text{ArcTanh}\left[\frac{(i-a)^{1/4}\,(1-i\,(a+b\,x))^{1/4}}{(i+a)^{1/4}\,(1+i\,(a+b\,x))^{1/4}}\right]}{(i-a)^{5/4}\,(i+a)^{3/4}}$$

Result (type 7, 133 leaves):

$$\frac{1}{4\,(-i+a)^2}b\left(\frac{8\,(-i+a)\,e^{\frac{3}{2}\,i\,\text{ArcTan}[a+b\,x]}}{1-e^{2\,i\,\text{ArcTan}[a+b\,x]}+i\,a\,\left(1+e^{2\,i\,\text{ArcTan}[a+b\,x]}\right)}+\text{RootSum}\left[i+a-i\,\#1^4+a\,\#1^4\,\&,\ \frac{-\text{ArcTan}[a+b\,x]+i\,\text{Log}\left[\left(e^{-\frac{1}{2}\,i\,\text{ArcTan}[a+b\,x]}-\#1\right)^2\right]}{\#1^3}\,\&\right]\right)$$

Problem 233: Result is not expressed in closed-form.

$$\int e^{-\frac{3}{2}\,i\,\text{ArcTan}[a+b\,x]}\,dx$$

Optimal (type 3, 338 leaves, 13 steps):

$$-\frac{i\,(1-i a-i b x)^{3/4}\,(1+i a+i b x)^{1/4}}{b}-\frac{3\,i\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2}\,b}+\frac{3\,i\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2}\,b}+\frac{3\,i\,\text{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}-\frac{\sqrt{2}\,(1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{2\sqrt{2}\,b}-\frac{3\,i\,\text{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}+\frac{\sqrt{2}\,(1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{2\sqrt{2}\,b}$$

Result (type 7, 90 leaves) :

$$-\frac{2\,i\,e^{-\frac{3}{2}i\,\text{ArcTan}[a+b x]}}{b\left(1+e^{-2 i\,\text{ArcTan}[a+b x]}\right)}-\frac{3\,\text{RootSum}\left[1+\#1^4\,\&,\ \frac{\text{ArcTan}[a+b x]-2\,i\,\text{Log}\left[e^{-\frac{1}{2}i\,\text{ArcTan}[a+b x]}-\#1\right]}{\#1}\,\&\right]}{4\,b}$$

Problem 234: Result is not expressed in closed-form.

$$\int\frac{e^{-\frac{3}{2}i\,\text{ArcTan}[a+b x]}}{x}\,dx$$

Optimal (type 3, 427 leaves, 18 steps) :

$$-\frac{2\,(i+a)^{3/4}\,\text{ArcTan}\left[\frac{(i+a)^{1/4}\,(1+i a+i b x)^{1/4}}{(i-a)^{1/4}\,(1-i a-i b x)^{1/4}}\right]}{(i-a)^{3/4}}-\sqrt{2}\,\text{ArcTan}\left[1-\frac{\sqrt{2}\,(1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]+\sqrt{2}\,\text{ArcTan}\left[1+\frac{\sqrt{2}\,(1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]-\frac{2\,(i+a)^{3/4}\,\text{ArcTanh}\left[\frac{(i+a)^{1/4}\,(1+i a+i b x)^{1/4}}{(i-a)^{1/4}\,(1-i a-i b x)^{1/4}}\right]}{(i-a)^{3/4}}+\frac{\text{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}-\frac{\sqrt{2}\,(1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2}}-\frac{\text{Log}\left[1+\frac{\sqrt{1-i a-i b x}}{\sqrt{1+i a+i b x}}+\frac{\sqrt{2}\,(1-i a-i b x)^{1/4}}{(1+i a+i b x)^{1/4}}\right]}{\sqrt{2}}$$

Result (type 7, 237 leaves) :

$$(-1)^{1/4}\left(\text{Log}\left[e^{-2 i\,\text{ArcTan}[a+b x]}\left((-1)^{1/4}-e^{\frac{1}{2}i\,\text{ArcTan}[a+b x]}\right)\right]+i\left(\text{Log}\left[e^{-2 i\,\text{ArcTan}[a+b x]}\left((-1)^{3/4}-e^{\frac{1}{2}i\,\text{ArcTan}[a+b x]}\right)\right]+i\,\text{Log}\left[e^{-2 i\,\text{ArcTan}[a+b x]}\left((-1)^{1/4}+e^{\frac{1}{2}i\,\text{ArcTan}[a+b x]}\right)\right]-\text{Log}\left[e^{-2 i\,\text{ArcTan}[a+b x]}\left((-1)^{3/4}+e^{\frac{1}{2}i\,\text{ArcTan}[a+b x]}\right)\right]\right)\right)+\frac{(1-i a)\,\text{RootSum}\left[i+a-i\,\#1^4+a\,\#1^4\,\&,\ \frac{\text{ArcTan}[a+b x]-i\,\text{Log}\left[\left(e^{-\frac{1}{2}i\,\text{ArcTan}[a+b x]}-\#1\right)^2\right]}{\#1}\,\&\right]}{2\,(-i+a)}$$

Problem 235: Result is not expressed in closed-form.

$$\int\frac{e^{-\frac{3}{2}i\,\text{ArcTan}[a+b x]}}{x^2}\,dx$$

Optimal (type 3, 211 leaves, 6 steps):

$$-\frac{(1-i a-i b x)^{3/4}(1+i a+i b x)^{1/4}}{(1+i a) x}-\frac{3 i b \operatorname{ArcTan}\left[\frac{(i+a)^{1/4}(1+i a+i b x)^{1/4}}{(i-a)^{1/4}(1-i a-i b x)^{1/4}}\right]}{(i-a)^{7/4}(i+a)^{1/4}}-\frac{3 i b \operatorname{ArcTanh}\left[\frac{(i+a)^{1/4}(1+i a+i b x)^{1/4}}{(i-a)^{1/4}(1-i a-i b x)^{1/4}}\right]}{(i-a)^{7/4}(i+a)^{1/4}}$$

Result (type 7, 133 leaves):

$$\frac{1}{4(-i+a)^2} b\left(\frac{8(-i+a) e^{\frac{1}{2} i \operatorname{ArcTan}[a+b x]}}{1-e^{2 i \operatorname{ArcTan}[a+b x]}+i a\left(1+e^{2 i \operatorname{ArcTan}[a+b x]}\right)}-3 \operatorname{RootSum}\left[i+a-i \#1^4+a \#1^4 \&, \frac{\operatorname{ArcTan}[a+b x]-i \operatorname{Log}\left[\left(e^{-\frac{1}{2} i \operatorname{ArcTan}[a+b x]}-\#1\right)^2\right]}{\#1} \&\right]\right)$$

Problem 236: Unable to integrate problem.

$$\int e^{n \operatorname{ArcTan}[a+b x]} x^m \, dx$$

Optimal (type 6, 140 leaves, 4 steps):

$$\frac{1}{1+m} x^{1+m}(1-i a-i b x)^{\frac{i n}{2}}(1+i a+i b x)^{-\frac{i n}{2}}\left(1-\frac{b x}{i-a}\right)^{\frac{i n}{2}}\left(1+\frac{b x}{i+a}\right)^{-\frac{i n}{2}} \operatorname{AppellF1}\left[1+m,-\frac{i n}{2}, \frac{i n}{2}, 2+m,-\frac{b x}{i+a}, \frac{b x}{i-a}\right]$$

Result (type 8, 16 leaves):

$$\int e^{n \operatorname{ArcTan}[a+b x]} x^m \, dx$$

Problem 241: Unable to integrate problem.

$$\int \frac{e^{n \operatorname{ArcTan}[a+b x]}}{x} \, dx$$

Optimal (type 5, 191 leaves, 5 steps):

$$\frac{2 i (1-i a-i b x)^{\frac{i n}{2}}(1+i a+i b x)^{-\frac{i n}{2}} \operatorname{Hypergeometric2F1}\left[1, \frac{i n}{2}, 1+\frac{i n}{2}, \frac{(i-a)(1-i a-i b x)}{(i+a)(1+i a+i b x)}\right]}{n}-$$

$$\frac{i 2^{1-\frac{i n}{2}}(1-i a-i b x)^{\frac{i n}{2}} \operatorname{Hypergeometric2F1}\left[\frac{i n}{2}, \frac{i n}{2}, 1+\frac{i n}{2}, \frac{1}{2}(1-i a-i b x)\right]}{n}$$

Result (type 8, 16 leaves):

$$\int \frac{e^{n \operatorname{ArcTan}[a+b x]}}{x} \, dx$$

Problem 242: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTan}[a+b\,x]}}{x^2}\,dx$$

Optimal (type 5, 128 leaves, 2 steps):

$$-\frac{4\,b\,(1-i\,a-i\,b\,x)^{1+\frac{i\,n}{2}}\,(1+i\,a+i\,b\,x)^{-1-\frac{i\,n}{2}}\,\text{Hypergeometric2F1}\left[2,\,1+\frac{i\,n}{2},\,2+\frac{i\,n}{2},\,\frac{(i-a)\,(1-i\,a-i\,b\,x)}{(i+a)\,(1+i\,a+i\,b\,x)}\right]}{(i+a)^2\,(2\,i-n)}$$

Result (type 8, 16 leaves):

$$\int \frac{e^{n\,\text{ArcTan}[a+b\,x]}}{x^2}\,dx$$

Problem 243: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTan}[a+b\,x]}}{x^3}\,dx$$

Optimal (type 5, 207 leaves, 3 steps):

$$-\frac{(1-i\,a-i\,b\,x)^{1+\frac{i\,n}{2}}\,(1+i\,a+i\,b\,x)^{1-\frac{i\,n}{2}}}{2\,(1+a^2)\,x^2}-\frac{1}{(i-a)\,(i+a)^3\,(2\,i-n)}$$

$$2\,b^2\,(2\,a-n)\,(1-i\,a-i\,b\,x)^{1+\frac{i\,n}{2}}\,(1+i\,a+i\,b\,x)^{-1-\frac{i\,n}{2}}\,\text{Hypergeometric2F1}\left[2,\,1+\frac{i\,n}{2},\,2+\frac{i\,n}{2},\,\frac{(i-a)\,(1-i\,a-i\,b\,x)}{(i+a)\,(1+i\,a+i\,b\,x)}\right]$$

Result (type 8, 16 leaves):

$$\int \frac{e^{n\,\text{ArcTan}[a+b\,x]}}{x^3}\,dx$$

Problem 244: Unable to integrate problem.

$$\int e^{\text{ArcTan}[a\,x]}\,(c+a^2\,c\,x^2)^p\,dx$$

Optimal (type 5, 102 leaves, 3 steps):

$$\frac{1}{a\,\left((2+i)+2\,p\right)}i\,2^{\left(1-\frac{i}{2}\right)+p}\,(1-i\,a\,x)^{\left(1+\frac{i}{2}\right)+p}\,(1+a^2\,x^2)^{-p}\,(c+a^2\,c\,x^2)^p\,\text{Hypergeometric2F1}\left[\frac{i}{2}-p,\,\left(1+\frac{i}{2}\right)+p,\,\left(2+\frac{i}{2}\right)+p,\,\frac{1}{2}\,(1-i\,a\,x)\right]$$

Result (type 8, 21 leaves):

$$\int e^{\text{ArcTan}[a x]} \left(c + a^2 c x^2\right)^p dx$$

Problem 259: Unable to integrate problem.

$$\int e^{2 \text{ArcTan}[a x]} \left(c + a^2 c x^2\right)^p dx$$

Optimal (type 5, 90 leaves, 3 steps):

$$\frac{1}{a \left(\left(1 + i\right) + p\right)} i\, 2^{-i+p} \left(1 - i a x\right)^{(1+i)+p} \left(1 + a^2 x^2\right)^{-p} \left(c + a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[i - p, \left(1 + i\right) + p, \left(2 + i\right) + p, \frac{1}{2} \left(1 - i a x\right)\right]$$

Result (type 8, 23 leaves):

$$\int e^{2 \text{ArcTan}[a x]} \left(c + a^2 c x^2\right)^p dx$$

Problem 260: Result more than twice size of optimal antiderivative.

$$\int e^{2 \text{ArcTan}[a x]} \left(c + a^2 c x^2\right)^2 dx$$

Optimal (type 5, 53 leaves, 2 steps):

$$\frac{\left(\frac{1}{5} + \frac{3 i}{5}\right) 2^{1-i} c^2 \left(1 - i a x\right)^{3+i} \text{Hypergeometric2F1}\left[-2 + i, 3 + i, 4 + i, \frac{1}{2} \left(1 - i a x\right)\right]}{a}$$

Result (type 5, 114 leaves):

$$\frac{1}{30 a} c^2 e^{2 \text{ArcTan}[a x]} \left(-13 + 56 a x - 16 a^2 x^2 + 22 a^3 x^3 - 3 a^4 x^4 + 6 a^5 x^5 - 40 i \,\text{Hypergeometric2F1}\left[-i, 1, 1 - i, -e^{2 i \text{ArcTan}[a x]}\right] + \left(20 + 20 i\right) e^{2 i \text{ArcTan}[a x]} \text{Hypergeometric2F1}\left[1, 1 - i, 2 - i, -e^{2 i \text{ArcTan}[a x]}\right]\right)$$

Problem 273: Unable to integrate problem.

$$\int e^{-\text{ArcTan}[a x]} \left(c + a^2 c x^2\right)^p dx$$

Optimal (type 5, 101 leaves, 3 steps):

$$\frac{1}{a \left(\left(-1 - 2 i\right) - 2 i p\right)} 2^{\left(1+\frac{i}{2}\right)+p} \left(1 - i a x\right)^{\left(1-\frac{i}{2}\right)+p} \left(1 + a^2 x^2\right)^{-p} \left(c + a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[-\frac{i}{2} - p, \left(1 - \frac{i}{2}\right) + p, \left(2 - \frac{i}{2}\right) + p, \frac{1}{2} \left(1 - i a x\right)\right]$$

Result (type 8, 23 leaves):

$$\int e^{-\text{ArcTan}[a x]} \left(c + a^2 c x^2\right)^p \, dx$$

Problem 283: Unable to integrate problem.

$$\int \frac{e^{-\text{ArcTan}[a x]}}{\sqrt{c + a^2 c x^2}} \, dx$$

Optimal (type 5, 93 leaves, 3 steps):

$$-\frac{(1 - i)\, 2^{-\frac{1}{2}+\frac{i}{2}} (1 - i a x)^{\frac{1}{2}-\frac{i}{2}} \sqrt{1 + a^2 x^2}\ \text{Hypergeometric2F1}\left[\frac{1}{2} - \frac{i}{2}, \frac{1}{2} - \frac{i}{2}, \frac{3}{2} - \frac{i}{2}, \frac{1}{2} (1 - i a x)\right]}{a \sqrt{c + a^2 c x^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{e^{-\text{ArcTan}[a x]}}{\sqrt{c + a^2 c x^2}} \, dx$$

Problem 284: Unable to integrate problem.

$$\int \frac{e^{-\text{ArcTan}[a x]}}{\left(c + a^2 c x^2\right)^{3/2}} \, dx$$

Optimal (type 3, 38 leaves, 1 step):

$$-\frac{e^{-\text{ArcTan}[a x]} (1 - a x)}{2 a c \sqrt{c + a^2 c x^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{e^{-\text{ArcTan}[a x]}}{\left(c + a^2 c x^2\right)^{3/2}} \, dx$$

Problem 285: Unable to integrate problem.

$$\int \frac{e^{-\text{ArcTan}[a x]}}{\left(c + a^2 c x^2\right)^{5/2}} \, dx$$

Optimal (type 3, 77 leaves, 2 steps):

$$-\frac{e^{-\text{ArcTan}[a x]} (1 - 3 a x)}{10 a c \left(c + a^2 c x^2\right)^{3/2}} - \frac{3 e^{-\text{ArcTan}[a x]} (1 - a x)}{10 a c^2 \sqrt{c + a^2 c x^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{e^{-\text{ArcTan}[a x]}}{\left(c+a^2 c x^2\right)^{5/2}} \, dx$$

Problem 286: Unable to integrate problem.

$$\int \frac{e^{-\text{ArcTan}[a x]}}{\left(c+a^2 c x^2\right)^{7/2}} \, dx$$

Optimal (type 3, 115 leaves, 3 steps):

$$-\frac{e^{-\text{ArcTan}[a x]} (1-5 a x)}{26 a c \left(c+a^2 c x^2\right)^{5/2}}-\frac{e^{-\text{ArcTan}[a x]} (1-3 a x)}{13 a c^2 \left(c+a^2 c x^2\right)^{3/2}}-\frac{3 e^{-\text{ArcTan}[a x]} (1-a x)}{13 a c^3 \sqrt{c+a^2 c x^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{e^{-\text{ArcTan}[a x]}}{\left(c+a^2 c x^2\right)^{7/2}} \, dx$$

Problem 287: Unable to integrate problem.

$$\int e^{-2 \text{ArcTan}[a x]} \left(c+a^2 c x^2\right)^p \, dx$$

Optimal (type 5, 90 leaves, 3 steps):

$$\frac{1}{a \left((1-i)+p\right)} i \, 2^{i+p} (1-i a x)^{(1-i)+p} \left(1+a^2 x^2\right)^{-p} \left(c+a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[-i-p, (1-i)+p, (2-i)+p, \frac{1}{2} (1-i a x)\right]$$

Result (type 8, 23 leaves):

$$\int e^{-2 \text{ArcTan}[a x]} \left(c+a^2 c x^2\right)^p \, dx$$

Problem 288: Result more than twice size of optimal antiderivative.

$$\int e^{-2 \text{ArcTan}[a x]} \left(c+a^2 c x^2\right)^2 \, dx$$

Optimal (type 5, 53 leaves, 2 steps):

$$-\frac{\left(\frac{1}{5}-\frac{3 i}{5}\right) 2^{1+i} c^2 (1-i a x)^{3-i} \text{Hypergeometric2F1}\left[-2-i, 3-i, 4-i, \frac{1}{2} (1-i a x)\right]}{a}$$

Result (type 5, 114 leaves):

$$\frac{1}{30\,a} c^2 e^{-2\,\text{ArcTan}[a\,x]} \left(13 + 56\,a\,x + 16\,a^2\,x^2 + 22\,a^3\,x^3 + 3\,a^4\,x^4 + 6\,a^5\,x^5 - 40\,i\,\text{Hypergeometric2F1}\left[i, 1, 1+i, -e^{2\,i\,\text{ArcTan}[a\,x]}\right] - (20 - 20\,i)\, e^{2\,i\,\text{ArcTan}[a\,x]}\,\text{Hypergeometric2F1}\left[1, 1+i, 2+i, -e^{2\,i\,\text{ArcTan}[a\,x]}\right]\right)$$

Problem 297: Unable to integrate problem.

$$\int \frac{e^{-2\,\text{ArcTan}[a\,x]}}{\sqrt{c + a^2\,c\,x^2}}\,dx$$

Optimal (type 5, 87 leaves, 3 steps):

$$-\frac{\left(\frac{2}{5} - \frac{i}{5}\right) 2^{\frac{1}{2}+i} (1 - i\,a\,x)^{\frac{1}{2}-i} \sqrt{1 + a^2\,x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2} - i, \frac{1}{2} - i, \frac{3}{2} - i, \frac{1}{2}(1 - i\,a\,x)\right]}{a\sqrt{c + a^2\,c\,x^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{e^{-2\,\text{ArcTan}[a\,x]}}{\sqrt{c + a^2\,c\,x^2}}\,dx$$

Problem 298: Unable to integrate problem.

$$\int \frac{e^{-2\,\text{ArcTan}[a\,x]}}{\left(c + a^2\,c\,x^2\right)^{3/2}}\,dx$$

Optimal (type 3, 38 leaves, 1 step):

$$-\frac{e^{-2\,\text{ArcTan}[a\,x]}\,(2 - a\,x)}{5\,a\,c\sqrt{c + a^2\,c\,x^2}}$$

Result (type 8, 25 leaves):

$$\int \frac{e^{-2\,\text{ArcTan}[a\,x]}}{\left(c + a^2\,c\,x^2\right)^{3/2}}\,dx$$

Problem 299: Unable to integrate problem.

$$\int \frac{e^{-2\,\text{ArcTan}[a\,x]}}{\left(c + a^2\,c\,x^2\right)^{5/2}}\,dx$$

Optimal (type 3, 77 leaves, 2 steps):

$$-\frac{e^{-2\,\text{ArcTan}[a\,x]}\,(2-3\,a\,x)}{13\,a\,c\,(c+a^2\,c\,x^2)^{3/2}}-\frac{6\,e^{-2\,\text{ArcTan}[a\,x]}\,(2-a\,x)}{65\,a\,c^2\,\sqrt{c+a^2\,c\,x^2}}$$

Result (type 8, 25 leaves):

$$\int\frac{e^{-2\,\text{ArcTan}[a\,x]}}{(c+a^2\,c\,x^2)^{5/2}}\,dx$$

Problem 300: Unable to integrate problem.

$$\int\frac{e^{-2\,\text{ArcTan}[a\,x]}}{(c+a^2\,c\,x^2)^{7/2}}\,dx$$

Optimal (type 3, 115 leaves, 3 steps):

$$-\frac{e^{-2\,\text{ArcTan}[a\,x]}\,(2-5\,a\,x)}{29\,a\,c\,(c+a^2\,c\,x^2)^{5/2}}-\frac{20\,e^{-2\,\text{ArcTan}[a\,x]}\,(2-3\,a\,x)}{377\,a\,c^2\,(c+a^2\,c\,x^2)^{3/2}}-\frac{24\,e^{-2\,\text{ArcTan}[a\,x]}\,(2-a\,x)}{377\,a\,c^3\,\sqrt{c+a^2\,c\,x^2}}$$

Result (type 8, 25 leaves):

$$\int\frac{e^{-2\,\text{ArcTan}[a\,x]}}{(c+a^2\,c\,x^2)^{7/2}}\,dx$$

Problem 310: Result unnecessarily involves higher level functions.

$$\int\frac{e^{5\,i\,\text{ArcTan}[a\,x]}}{\sqrt{c+a^2\,c\,x^2}}\,dx$$

Optimal (type 3, 131 leaves, 4 steps):

$$-\frac{2\,i\,\sqrt{1+a^2\,x^2}}{a\,(1-i\,a\,x)^2\,\sqrt{c+a^2\,c\,x^2}}+\frac{4\,i\,\sqrt{1+a^2\,x^2}}{a\,(1-i\,a\,x)\,\sqrt{c+a^2\,c\,x^2}}+\frac{i\,\sqrt{1+a^2\,x^2}\,\text{Log}[i+a\,x]}{a\,\sqrt{c+a^2\,c\,x^2}}$$

Result (type 4, 131 leaves):

$$\left(\sqrt{c+a^2\,c\,x^2}\,\left(-2\,i\,a\,(i+a\,x)^2\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{a^2}\,x\right],1\right]+i\,\sqrt{a^2}\,\left(-1+2\,i\,a\,x-3\,a^2\,x^2+(i+a\,x)^2\,\text{Log}\left[1+a^2\,x^2\right]\right)\right)\right)\Big/\left(2\,a\,\sqrt{a^2}\,c\,(i+a\,x)^2\,\sqrt{1+a^2\,x^2}\right)$$

Problem 312: Result unnecessarily involves higher level functions.

$$\int \frac{e^{3\, i\, \text{ArcTan}[a\, x]}}{\sqrt{c + a^2 c\, x^2}}\, dx$$

Optimal (type 3, 84 leaves, 4 steps):

$$\frac{2 \sqrt{1 + a^2 x^2}}{a\, (i + a\, x) \sqrt{c + a^2 c\, x^2}} - \frac{i \sqrt{1 + a^2 x^2}\, \text{Log}[i + a\, x]}{a \sqrt{c + a^2 c\, x^2}}$$

Result (type 4, 117 leaves):

$$\left(\sqrt{c + a^2 c\, x^2} \left(2\, i\, a\, (i + a\, x)\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{a^2}\, x\right], 1\right] + \sqrt{a^2}\, \left(2 + 2\, i\, a\, x + (1 - i\, a\, x)\, \text{Log}\left[1 + a^2 x^2\right]\right)\right)\right) \Big/ \left(2\, a \sqrt{a^2}\, c\, (i + a\, x) \sqrt{1 + a^2 x^2}\right)$$

Problem 314: Result unnecessarily involves higher level functions.

$$\int \frac{e^{i\, \text{ArcTan}[a\, x]}}{\sqrt{c + a^2 c\, x^2}}\, dx$$

Optimal (type 3, 42 leaves, 3 steps):

$$\frac{i \sqrt{1 + a^2 x^2}\, \text{Log}[i + a\, x]}{a \sqrt{c + a^2 c\, x^2}}$$

Result (type 4, 81 leaves):

$$\frac{i \sqrt{1 + a^2 x^2}\, \left(-2\, a\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{a^2}\, x\right], 1\right] + \sqrt{a^2}\, \text{Log}\left[1 + a^2 x^2\right]\right)}{2\, a \sqrt{a^2} \sqrt{c + a^2 c\, x^2}}$$

Problem 315: Result unnecessarily involves higher level functions.

$$\int \frac{e^{-i\, \text{ArcTan}[a\, x]}}{\sqrt{c + a^2 c\, x^2}}\, dx$$

Optimal (type 3, 43 leaves, 3 steps):

$$-\frac{i \sqrt{1 + a^2 x^2}\, \text{Log}[i - a\, x]}{a \sqrt{c + a^2 c\, x^2}}$$

Result (type 4, 81 leaves):

$$-\frac{i\sqrt{1+a^2x^2}\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{a^2}\,x\right],1\right]+\sqrt{a^2}\,\text{Log}\left[1+a^2x^2\right]\right)}{2\,a\sqrt{a^2}\sqrt{c+a^2c\,x^2}}$$

Problem 317: Result unnecessarily involves higher level functions.

$$\int\frac{e^{-3\,i\,\text{ArcTan}[a\,x]}}{\sqrt{c+a^2c\,x^2}}\,dx$$

Optimal (type 3, 86 leaves, 4 steps):

$$-\frac{2\sqrt{1+a^2x^2}}{a\,(i-a\,x)\sqrt{c+a^2c\,x^2}}+\frac{i\sqrt{1+a^2x^2}\,\text{Log}[i-a\,x]}{a\sqrt{c+a^2c\,x^2}}$$

Result (type 4, 116 leaves):

$$\left(\sqrt{c+a^2c\,x^2}\left(2\,a\,(1+i\,a\,x)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{a^2}\,x\right],1\right]+\sqrt{a^2}\left(2-2\,i\,a\,x+(1+i\,a\,x)\,\text{Log}\left[1+a^2x^2\right]\right)\right)\right)\Big/\left(2\,a\sqrt{a^2}\,c\,(-i+a\,x)\sqrt{1+a^2x^2}\right)$$

Problem 337: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTan}[a\,x]}\left(c+a^2c\,x^2\right)^2dx$$

Optimal (type 5, 86 leaves, 2 steps):

$$-\frac{2^{3-\frac{i\,n}{2}}\,c^2\,(1-i\,a\,x)^{3+\frac{i\,n}{2}}\,\text{Hypergeometric2F1}\left[-2+\frac{i\,n}{2},\,3+\frac{i\,n}{2},\,4+\frac{i\,n}{2},\,\frac{1}{2}(1-i\,a\,x)\right]}{a\,(6\,i-n)}$$

Result (type 5, 207 leaves):

$$\frac{1}{120\,a}c^2\,e^{n\,\text{ArcTan}[a\,x]}$$

$$\Big(-22\,n-n^3+120\,a\,x+22\,a\,n^2x+a\,n^4x-28\,a^2n\,x^2-a^2n^3x^2+80\,a^3x^3+2\,a^3n^2x^3-6\,a^4n\,x^4+24\,a^5x^5+e^{2\,i\,\text{ArcTan}[a\,x]}\,n\left(32+16\,i\,n+2\,n^2+i\,n^3\right)$$

$$\text{Hypergeometric2F1}\left[1,\,1-\frac{i\,n}{2},\,2-\frac{i\,n}{2},\,-e^{2\,i\,\text{ArcTan}[a\,x]}\right]-i\left(64+20\,n^2+n^4\right)\text{Hypergeometric2F1}\left[1,\,-\frac{i\,n}{2},\,1-\frac{i\,n}{2},\,-e^{2\,i\,\text{ArcTan}[a\,x]}\right]\Big)$$

Problem 348: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTan}[a\,x]}\left(c+a^2c\,x^2\right)^{3/2}dx$$

Optimal (type 5, 121 leaves, 3 steps):

$$-\frac{1}{a\,(5\,i-n)\,\sqrt{1+a^2\,x^2}}2^{\frac{5}{2}-\frac{i\,n}{2}}\,c\,(1-i\,a\,x)^{\frac{1}{2}(5+i\,n)}\,\sqrt{c+a^2\,c\,x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2}\,(-3+i\,n),\,\frac{1}{2}\,(5+i\,n),\,\frac{1}{2}\,(7+i\,n),\,\frac{1}{2}\,(1-i\,a\,x)\right]$$

Result (type 5, 267 leaves):

$$\frac{1}{96\,a\,\sqrt{c+a^2\,c\,x^2}}$$
$$c^2\left(e^{n\,\text{ArcTan}[a\,x]}\,(1+a^2\,x^2)^2\,\left(n-3\,n^3+18\,a\,x+2\,a\,n^2\,x+2\,a\,(-3+n^2)\,x\,\text{Cos}[2\,\text{ArcTan}[a\,x]]-n\,(-3+n^2)\,\sqrt{1+a^2\,x^2}\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\right)+\right.$$
$$8\,e^{(i+n)\,\text{ArcTan}[a\,x]}\,(3\,i-3\,n-i\,n^2+n^3)\,\sqrt{1+a^2\,x^2}\,\text{Hypergeometric2F1}\left[1,\,\frac{1}{2}-\frac{i\,n}{2},\,\frac{3}{2}-\frac{i\,n}{2},\,-e^{2\,i\,\text{ArcTan}[a\,x]}\right]+$$
$$\left.48\,e^{n\,\text{ArcTan}[a\,x]}\,(1+a^2\,x^2)\,\left(-n+a\,x+\left(1+e^{2\,i\,\text{ArcTan}[a\,x]}\right)\,(-i+n)\,\text{Hypergeometric2F1}\left[1,\,\frac{1}{2}-\frac{i\,n}{2},\,\frac{3}{2}-\frac{i\,n}{2},\,-e^{2\,i\,\text{ArcTan}[a\,x]}\right]\right)\right)$$

Problem 351: Result more than twice size of optimal antiderivative.

$$\int e^{n\,\text{ArcTan}[a\,x]}\,x^2\,(c+a^2\,c\,x^2)^{3/2}\,dx$$

Optimal (type 5, 283 leaves, 5 steps):

$$-\frac{c\,n\,(1-i\,a\,x)^{\frac{1}{2}(5+i\,n)}\,(1+i\,a\,x)^{\frac{1}{2}(5-i\,n)}\,\sqrt{c+a^2\,c\,x^2}}{30\,a^3\,\sqrt{1+a^2\,x^2}}+\frac{c\,x\,(1-i\,a\,x)^{\frac{1}{2}(5+i\,n)}\,(1+i\,a\,x)^{\frac{1}{2}(5-i\,n)}\,\sqrt{c+a^2\,c\,x^2}}{6\,a^2\,\sqrt{1+a^2\,x^2}}+\frac{1}{15\,a^3\,(5\,i-n)\,\sqrt{1+a^2\,x^2}}$$
$$2^{\frac{3}{2}-\frac{i\,n}{2}}\,c\,(5-n^2)\,(1-i\,a\,x)^{\frac{1}{2}(5+i\,n)}\,\sqrt{c+a^2\,c\,x^2}\,\text{Hypergeometric2F1}\left[\frac{1}{2}\,(-3+i\,n),\,\frac{1}{2}\,(5+i\,n),\,\frac{1}{2}\,(7+i\,n),\,\frac{1}{2}\,(1-i\,a\,x)\right]$$

Result (type 5, 1283 leaves):

$$\frac{1}{48\,a^3\sqrt{c\left(1+a^2x^2\right)}}c^2\sqrt{1+a^2x^2}\left(-\frac{1}{2}e^{n\,\text{ArcTan}[a\,x]}\left(1+a^2x^2\right)^2\left(\frac{n\left(-1+3n^2\right)}{\sqrt{1+a^2x^2}}-\frac{2\,a\,x\left(9+n^2+\left(-3+n^2\right)\text{Cos}[2\,\text{ArcTan}[a\,x]]\right)}{\sqrt{1+a^2x^2}}+n\left(-3+n^2\right)\text{Cos}[3\,\text{ArcTan}[a\,x]]\right)+4\,e^{(i+n)\,\text{ArcTan}[a\,x]}\left(3\,i-3\,n-i\,n^2+n^3\right)\text{Hypergeometric2F1}\left[1,\frac{1}{2}-\frac{i\,n}{2},\frac{3}{2}-\frac{i\,n}{2},-e^{2\,i\,\text{ArcTan}[a\,x]}\right]\right)+$$

$$\frac{1}{a^3}c^2\left(-\frac{e^{n\,\text{ArcTan}[a\,x]}\left(19\,n-25\,n^3+n^5\right)\sqrt{1+a^2x^2}}{720\sqrt{c\left(1+a^2x^2\right)}}+\left(e^{(i+n)\,\text{ArcTan}[a\,x]}\left(e^{2\,i\,\text{ArcTan}[a\,x]}\right)^{\frac{1}{2}-\frac{i\,n}{2}+\frac{1}{2}i\,(i+n)}\left(1+n^2\right)\left(45-26\,n^2+n^4\right)\sqrt{1+a^2x^2}\,\text{Hypergeometric2F1}\left[1,-\frac{1}{2}i\,(i+n),1-\frac{1}{2}i\,(i+n),-e^{2\,i\,\text{ArcTan}[a\,x]}\right]\right)\Big/\left(360\,(i+n)\sqrt{c\left(1+a^2x^2\right)}\right)+\right.$$

$$\frac{e^{n\,\text{ArcTan}[a\,x]}\sqrt{1+a^2x^2}}{48\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+\frac{e^{n\,\text{ArcTan}[a\,x]}\left(-30-2\,n+n^2\right)\sqrt{1+a^2x^2}}{480\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{e^{n\,\text{ArcTan}[a\,x]}\left(45+26\,n-26\,n^2-n^3+n^4\right)\sqrt{1+a^2x^2}}{1440\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-\frac{e^{n\,\text{ArcTan}[a\,x]}\,n\sqrt{1+a^2x^2}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{120\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}-$$

$$\frac{e^{n\,\text{ArcTan}[a\,x]}\,n\left(-26+n^2\right)\sqrt{1+a^2x^2}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{720\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}-\frac{e^{n\,\text{ArcTan}[a\,x]}\,n\left(19-25\,n^2+n^4\right)\sqrt{1+a^2x^2}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{720\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}-$$

$$\frac{e^{n\,\text{ArcTan}[a\,x]}\sqrt{1+a^2x^2}}{48\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+\frac{e^{n\,\text{ArcTan}[a\,x]}\,n\sqrt{1+a^2x^2}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{120\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}-$$

$$\frac{e^{n\,\text{ArcTan}[a\,x]}\left(-30+2\,n+n^2\right)\sqrt{1+a^2x^2}}{480\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+\frac{e^{n\,\text{ArcTan}[a\,x]}\,n\left(-26+n^2\right)\sqrt{1+a^2x^2}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{720\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}-$$

$$\left.\frac{e^{n\,\text{ArcTan}[a\,x]}\left(45-26\,n-26\,n^2+n^3+n^4\right)\sqrt{1+a^2x^2}}{1440\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+\frac{e^{n\,\text{ArcTan}[a\,x]}\,n\left(19-25\,n^2+n^4\right)\sqrt{1+a^2x^2}\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{720\sqrt{c\left(1+a^2x^2\right)}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 360: Unable to integrate problem.

$$\int e^{n\,\text{ArcTan}[a\,x]}\left(c+a^2c\,x^2\right)^{1/3}dx$$

Optimal (type 5, 120 leaves, 3 steps) :

$$-\frac{1}{a\,(8\,i-3\,n)\,\left(1+a^2\,x^2\right)^{1/3}}3\times 2^{\frac{4}{3}-\frac{i\,n}{2}}\,(1-i\,a\,x)^{\frac{1}{6}(8+3\,i\,n)}\,\left(c+a^2\,c\,x^2\right)^{1/3}\,\text{Hypergeometric2F1}\left[\frac{1}{6}\,(-2+3\,i\,n),\,\frac{1}{6}\,(8+3\,i\,n),\,\frac{1}{6}\,(14+3\,i\,n),\,\frac{1}{2}\,(1-i\,a\,x)\right]$$

Result (type 8, 25 leaves):

$$\int e^{n\,\text{ArcTan}[a\,x]}\,\left(c+a^2\,c\,x^2\right)^{1/3}\,dx$$

Problem 361: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}}{\left(c+a^2\,c\,x^2\right)^{1/3}}\,dx$$

Optimal (type 5, 120 leaves, 3 steps):

$$-\left(\left(3\times 2^{\frac{2}{3}-\frac{i\,n}{2}}\,(1-i\,a\,x)^{\frac{1}{6}(4+3\,i\,n)}\,\left(1+a^2\,x^2\right)^{1/3}\,\text{Hypergeometric2F1}\left[\frac{1}{6}\,(2+3\,i\,n),\,\frac{1}{6}\,(4+3\,i\,n),\,\frac{1}{6}\,(10+3\,i\,n),\,\frac{1}{2}\,(1-i\,a\,x)\right]\right)\Big/\left(a\,(4\,i-3\,n)\,\left(c+a^2\,c\,x^2\right)^{1/3}\right)\right)$$

Result (type 8, 25 leaves):

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}}{\left(c+a^2\,c\,x^2\right)^{1/3}}\,dx$$

Problem 362: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}}{\left(c+a^2\,c\,x^2\right)^{2/3}}\,dx$$

Optimal (type 5, 120 leaves, 3 steps):

$$-\left(\left(3\times 2^{\frac{1}{3}-\frac{i\,n}{2}}\,(1-i\,a\,x)^{\frac{1}{6}(2+3\,i\,n)}\,\left(1+a^2\,x^2\right)^{2/3}\,\text{Hypergeometric2F1}\left[\frac{1}{6}\,(2+3\,i\,n),\,\frac{1}{6}\,(4+3\,i\,n),\,\frac{1}{6}\,(8+3\,i\,n),\,\frac{1}{2}\,(1-i\,a\,x)\right]\right)\Big/\left(a\,(2\,i-3\,n)\,\left(c+a^2\,c\,x^2\right)^{2/3}\right)\right)$$

Result (type 8, 25 leaves):

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}}{\left(c+a^2\,c\,x^2\right)^{2/3}}\,dx$$

Problem 363: Unable to integrate problem.

$$\int \frac{e^{n \operatorname{ArcTan}[a x]}}{\left(c+a^2 c x^2\right)^{4/3}} \, dx$$

Optimal (type 5, 123 leaves, 3 steps):

$$\left(3 \times 2^{-\frac{1}{3}-\frac{i n}{2}} (1-i a x)^{\frac{1}{6}(-2+3 i n)} \left(1+a^2 x^2\right)^{1/3} \text{Hypergeometric2F1}\left[\frac{1}{6}(-2+3 i n), \frac{1}{6}(8+3 i n), \frac{1}{6}(4+3 i n), \frac{1}{2}(1-i a x)\right]\right) \Big/ \left(a c (2 i+3 n) \left(c+a^2 c x^2\right)^{1/3}\right)$$

Result (type 8, 25 leaves):

$$\int \frac{e^{n \operatorname{ArcTan}[a x]}}{\left(c+a^2 c x^2\right)^{4/3}} \, dx$$

Problem 364: Unable to integrate problem.

$$\int e^{n \operatorname{ArcTan}[a x]} x^m \left(c+a^2 c x^2\right) dx$$

Optimal (type 6, 49 leaves, 2 steps):

$$\frac{c x^{1+m} \text{AppellF1}\left[1+m, -1-\frac{i n}{2}, -1+\frac{i n}{2}, 2+m, i a x, -i a x\right]}{1+m}$$

Result (type 8, 24 leaves):

$$\int e^{n \operatorname{ArcTan}[a x]} x^m \left(c+a^2 c x^2\right) dx$$

Problem 366: Unable to integrate problem.

$$\int \frac{e^{n \operatorname{ArcTan}[a x]} x^m}{\left(c+a^2 c x^2\right)^2} \, dx$$

Optimal (type 6, 51 leaves, 2 steps):

$$\frac{x^{1+m} \text{AppellF1}\left[1+m, 2-\frac{i n}{2}, 2+\frac{i n}{2}, 2+m, i a x, -i a x\right]}{c^2 (1+m)}$$

Result (type 8, 26 leaves):

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}\,x^m}{\left(c+a^2\,c\,x^2\right)^2}\,dx$$

Problem 367: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}\,x^m}{\left(c+a^2\,c\,x^2\right)^3}\,dx$$

Optimal (type 6, 51 leaves, 2 steps):

$$\frac{x^{1+m}\,\text{AppellF1}\left[1+m,\,3-\frac{i\,n}{2},\,3+\frac{i\,n}{2},\,2+m,\,i\,a\,x,\,-i\,a\,x\right]}{c^3\,(1+m)}$$

Result (type 8, 26 leaves):

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}\,x^m}{\left(c+a^2\,c\,x^2\right)^3}\,dx$$

Problem 368: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}\,x^m}{\sqrt{c+a^2\,c\,x^2}}\,dx$$

Optimal (type 6, 79 leaves, 3 steps):

$$\frac{x^{1+m}\,\sqrt{1+a^2\,x^2}\,\text{AppellF1}\left[1+m,\,\frac{1}{2}\,(1-i\,n),\,\frac{1}{2}\,(1+i\,n),\,2+m,\,i\,a\,x,\,-i\,a\,x\right]}{(1+m)\,\sqrt{c+a^2\,c\,x^2}}$$

Result (type 8, 28 leaves):

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}\,x^m}{\sqrt{c+a^2\,c\,x^2}}\,dx$$

Problem 369: Unable to integrate problem.

$$\int \frac{e^{n\,\text{ArcTan}[a\,x]}\,x^m}{\left(c+a^2\,c\,x^2\right)^{3/2}}\,dx$$

Optimal (type 6, 82 leaves, 3 steps):

$$\frac{x^{1+m}\sqrt{1+a^2x^2}\,\text{AppellF1}\left[1+m,\frac{1}{2}(3-i n),\frac{1}{2}(3+i n),2+m,i a x,-i a x\right]}{c(1+m)\sqrt{c+a^2 c x^2}}$$

Result (type 8, 28 leaves) :

$$\int \frac{e^{n \text{ArcTan}[a x]} x^m}{\left(c+a^2 c x^2\right)^{3/2}} \, dx$$

Problem 370: Unable to integrate problem.

$$\int \frac{e^{n \text{ArcTan}[a x]} x^m}{\left(c+a^2 c x^2\right)^{5/2}} \, dx$$

Optimal (type 6, 82 leaves, 3 steps) :

$$\frac{x^{1+m}\sqrt{1+a^2x^2}\,\text{AppellF1}\left[1+m,\frac{1}{2}(5-i n),\frac{1}{2}(5+i n),2+m,i a x,-i a x\right]}{c^2(1+m)\sqrt{c+a^2 c x^2}}$$

Result (type 8, 28 leaves) :

$$\int \frac{e^{n \text{ArcTan}[a x]} x^m}{\left(c+a^2 c x^2\right)^{5/2}} \, dx$$

Problem 371: Unable to integrate problem.

$$\int e^{n \text{ArcTan}[a x]} \left(c+a^2 c x^2\right)^p \, dx$$

Optimal (type 5, 115 leaves, 3 steps) :

$$\frac{1}{a(n-2 i(1+p))} 2^{1-\frac{i n}{2}+p} (1-i a x)^{1+\frac{i n}{2}+p} \left(1+a^2x^2\right)^{-p} \left(c+a^2 c x^2\right)^p \text{Hypergeometric2F1}\left[\frac{i n}{2}-p, 1+\frac{i n}{2}+p, 2+\frac{i n}{2}+p, \frac{1}{2}(1-i a x)\right]$$

Result (type 8, 23 leaves) :

$$\int e^{n \text{ArcTan}[a x]} \left(c+a^2 c x^2\right)^p \, dx$$

Test results for the 153 problems in "5.3.7 Inverse tangent functions.m"

Problem 15: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]}{x^2} \, dx$$

Optimal (type 3, 59 leaves, 4 steps):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]}{x}-\frac{\sqrt{-e}\, \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{\sqrt{d}}$$

Result (type 3, 86 leaves):

$$-\frac{\text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]}{x}+\frac{i \sqrt{e}\, \text{Log}\left[\frac{2 i \sqrt{d}}{\sqrt{e}\, x}-\frac{2 \sqrt{-e}\, \sqrt{d+e x^2}}{e x}\right]}{\sqrt{d}}$$

Problem 18: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{9/2}\, \text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right] dx$$

Optimal (type 4, 211 leaves, 6 steps):

$$\frac{60 d^2 \sqrt{x}\, \sqrt{d+e x^2}}{847 (-e)^{5/2}}+\frac{36 d x^{5/2} \sqrt{d+e x^2}}{847 (-e)^{3/2}}+\frac{4 x^{9/2} \sqrt{d+e x^2}}{121 \sqrt{-e}}+$$
$$\frac{2}{11} x^{11/2}\, \text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]+\frac{30 d^{11/4} \sqrt{-e}\, \left(\sqrt{d}+\sqrt{e}\, x\right) \sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\, \text{EllipticF}\left[2\, \text{ArcTan}\left[\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right], \frac{1}{2}\right]}{847 e^{13/4} \sqrt{d+e x^2}}$$

Result (type 4, 170 leaves):

$$\frac{4 \sqrt{x}\, \sqrt{d+e x^2}\, \left(15 d^2-9 d e x^2+7 e^2 x^4\right)}{847 (-e)^{5/2}}+\frac{2}{11} x^{11/2}\, \text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]-\frac{60 i d^3 \sqrt{1+\frac{d}{e x^2}}\, x\, \text{EllipticF}\left[i\, \text{ArcSinh}\left[\frac{\sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right], -1\right]}{847 \sqrt{\frac{i \sqrt{d}}{\sqrt{e}}}\, (-e)^{5/2} \sqrt{d+e x^2}}$$

Problem 19: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]dx$$

Optimal (type 4, 181 leaves, 5 steps):

$$\frac{20\,d\,\sqrt{x}\,\sqrt{d+e\,x^2}}{147\,(-e)^{3/2}}+\frac{4\,x^{5/2}\,\sqrt{d+e\,x^2}}{49\,\sqrt{-e}}+\frac{2}{7}\,x^{7/2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]-\frac{10\,d^{7/4}\,\sqrt{-e}\,\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\,\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{147\,e^{9/4}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 158 leaves):

$$\frac{2}{147}\,\sqrt{x}\,\left(\frac{2\,\left(5\,d-3\,e\,x^2\right)\sqrt{d+e\,x^2}}{(-e)^{3/2}}+21\,x^3\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]\right)-\frac{20\,i\,d^2\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{147\,\sqrt{\frac{i\,\sqrt{d}}{\sqrt{e}}}\,(-e)^{3/2}\,\sqrt{d+e\,x^2}}$$

Problem 20: Result unnecessarily involves imaginary or complex numbers.

$$\int \sqrt{x}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]dx$$

Optimal (type 4, 153 leaves, 4 steps):

$$\frac{4\,\sqrt{x}\,\sqrt{d+e\,x^2}}{9\,\sqrt{-e}}+\frac{2}{3}\,x^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]+\frac{2\,d^{3/4}\,\sqrt{-e}\,\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\,\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{9\,e^{5/4}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 147 leaves):

$$\frac{4\,\sqrt{x}\,\sqrt{d+e\,x^2}}{9\,\sqrt{-e}}+\frac{2}{3}\,x^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]-\frac{4\,i\,d\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{9\,\sqrt{\frac{i\,\sqrt{d}}{\sqrt{e}}}\,\sqrt{-e}\,\sqrt{d+e\,x^2}}$$

Problem 21: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e x^2}}\right]}{x^{3/2}}\,dx$$

Optimal (type 4, 122 leaves, 3 steps):

$$-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e x^2}}\right]}{\sqrt{x}}+\frac{2\sqrt{-e}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{d^{1/4}\,e^{1/4}\sqrt{d+e x^2}}$$

Result (type 4, 115 leaves):

$$-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e x^2}}\right]}{\sqrt{x}}+\frac{4\,i\sqrt{-e}\sqrt{1+\frac{d}{e x^2}}\,x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\sqrt{d+e x^2}}$$

Problem 22: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e x^2}}\right]}{x^{7/2}}\,dx$$

Optimal (type 4, 156 leaves, 4 steps):

$$-\frac{4\sqrt{-e}\sqrt{d+e x^2}}{15\,d\,x^{3/2}}-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e x^2}}\right]}{5\,x^{5/2}}-\frac{2\sqrt{-e}\,e^{3/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{15\,d^{5/4}\sqrt{d+e x^2}}$$

Result (type 4, 150 leaves):

$$-\frac{2\left(2\sqrt{-e}\,x\sqrt{d+e x^2}+3\,d\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e x^2}}\right]\right)}{15\,d\,x^{5/2}}+\frac{4\,i\,(-e)^{3/2}\sqrt{1+\frac{d}{e x^2}}\,x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{15\,d\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\sqrt{d+e x^2}}$$

Problem 23: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]}{x^{11/2}}\, dx$$

Optimal (type 4, 186 leaves, 5 steps):

$$-\frac{4\sqrt{-e}\,\sqrt{d+e x^2}}{63\, d\, x^{7/2}}-\frac{20\,(-e)^{3/2}\sqrt{d+e x^2}}{189\, d^2\, x^{3/2}}-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]}{9\, x^{9/2}}+\frac{10\sqrt{-e}\; e^{7/4}\left(\sqrt{d}+\sqrt{e}\, x\right)\sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\;\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{189\, d^{9/4}\sqrt{d+e x^2}}$$

Result (type 4, 162 leaves):

$$\frac{4\sqrt{-e}\; x\sqrt{d+e x^2}\,\left(-3 d+5 e x^2\right)-42\, d^2\,\text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]}{189\, d^2\, x^{9/2}}+\frac{20\, i\,(-e)^{5/2}\sqrt{1+\frac{d}{e x^2}}\; x\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{189\, d^2\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\;\sqrt{d+e x^2}}$$

Problem 24: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]}{x^{15/2}}\, dx$$

Optimal (type 4, 216 leaves, 6 steps):

$$-\frac{4\sqrt{-e}\,\sqrt{d+e x^2}}{143\, d\, x^{11/2}}-\frac{36\,(-e)^{3/2}\sqrt{d+e x^2}}{1001\, d^2\, x^{7/2}}-\frac{60\,(-e)^{5/2}\sqrt{d+e x^2}}{1001\, d^3\, x^{3/2}}-$$
$$\frac{2\,\text{ArcTan}\left[\frac{\sqrt{-e}\, x}{\sqrt{d+e x^2}}\right]}{13\, x^{13/2}}-\frac{30\sqrt{-e}\; e^{11/4}\left(\sqrt{d}+\sqrt{e}\, x\right)\sqrt{\frac{d+e x^2}{\left(\sqrt{d}+\sqrt{e}\, x\right)^2}}\;\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{1001\, d^{13/4}\sqrt{d+e x^2}}$$

Result (type 4, 171 leaves):

$$\frac{1}{1001\,x^{13/2}}2\left(-\frac{2\sqrt{-e}\sqrt{d+e\,x^2}\left(7\,d^2\,x-9\,d\,e\,x^3+15\,e^2\,x^5\right)}{d^3}-77\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]+\frac{30\,i\,(-e)^{7/2}\sqrt{1+\frac{d}{e\,x^2}}\,x^{15/2}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\frac{\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}}{\sqrt{x}}\right],-1\right]}{d^3\sqrt{\frac{i\sqrt{d}}{\sqrt{e}}}\sqrt{d+e\,x^2}}\right)$$

Problem 25: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{7/2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]dx$$

Optimal (type 4, 326 leaves, 7 steps):

$$\frac{28\,d\,x^{3/2}\sqrt{d+e\,x^2}}{405\,(-e)^{3/2}}+\frac{4\,x^{7/2}\sqrt{d+e\,x^2}}{81\sqrt{-e}}-\frac{28\,d^2\sqrt{-e}\sqrt{x}\sqrt{d+e\,x^2}}{135\,e^{5/2}\left(\sqrt{d}+\sqrt{e}\,x\right)}+$$
$$\frac{2}{9}x^{9/2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]+\frac{28\,d^{9/4}\sqrt{-e}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{135\,e^{11/4}\sqrt{d+e\,x^2}}-$$
$$\frac{14\,d^{9/4}\sqrt{-e}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{135\,e^{11/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 263 leaves):

$$\left(2\sqrt{x}\left(x\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\left(14\,d^2\sqrt{-e^2}+4\,d\sqrt{-e}\,e^{3/2}\,x^2+10\left(-e^2\right)^{3/2}x^4+45\,e^{5/2}\,x^3\sqrt{d+e\,x^2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]\right)-\right.\right.$$
$$42\,d^{5/2}\sqrt{-e}\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+$$
$$\left.\left.42\,d^{5/2}\sqrt{-e}\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\right)\Big/\left(405\,e^{5/2}\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\right)$$

Problem 26: Result unnecessarily involves imaginary or complex numbers.

$$\int x^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]dx$$

Optimal (type 4, 296 leaves, 6 steps):

$$\frac{4\,x^{3/2}\,\sqrt{d+e\,x^2}}{25\,\sqrt{-e}}+\frac{12\,d\,\sqrt{-e}\,\sqrt{x}\,\sqrt{d+e\,x^2}}{25\,e^{3/2}\,\left(\sqrt{d}+\sqrt{e}\,x\right)}+\frac{2}{5}\,x^{5/2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]-$$
$$\frac{12\,d^{5/4}\,\sqrt{-e}\,\left(\sqrt{d}+\sqrt{e}\,x\right)\,\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\,\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{25\,e^{7/4}\,\sqrt{d+e\,x^2}}+$$
$$\frac{6\,d^{5/4}\,\sqrt{-e}\,\left(\sqrt{d}+\sqrt{e}\,x\right)\,\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\,\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{25\,e^{7/4}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 244 leaves):

$$-\frac{1}{25\,e^{3/2}\,\sqrt{\frac{i\,\sqrt{e}\,x}{\sqrt{d}}}\,\sqrt{d+e\,x^2}}2\,\sqrt{x}\,\left(x\,\sqrt{\frac{i\,\sqrt{e}\,x}{\sqrt{d}}}\,\left(2\,d\,\sqrt{-e^2}+2\,\sqrt{-e}\,e^{3/2}\,x^2-5\,e^{3/2}\,x\,\sqrt{d+e\,x^2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]\right)-\right.$$
$$\left.6\,d^{3/2}\,\sqrt{-e}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\,\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+6\,d^{3/2}\,\sqrt{-e}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\,\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)$$

Problem 27: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]}{\sqrt{x}}\,dx$$

Optimal (type 4, 260 leaves, 5 steps):

$$-\frac{4\sqrt{-e}\,\sqrt{x}\,\sqrt{d+e\,x^2}}{\sqrt{e}\left(\sqrt{d}+\sqrt{e}\,x\right)}+2\sqrt{x}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]+\frac{4\,d^{1/4}\sqrt{-e}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{e^{3/4}\sqrt{d+e\,x^2}}-\frac{2\,d^{1/4}\sqrt{-e}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{e^{3/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 208 leaves):

$$\frac{1}{\sqrt{e}\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}}2\sqrt{x}\left(\sqrt{e}\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]-2\sqrt{d}\sqrt{-e}\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+2\sqrt{d}\sqrt{-e}\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)$$

Problem 28: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{5/2}}\,dx$$

Optimal (type 4, 298 leaves, 6 steps):

$$-\frac{4\sqrt{-e}\sqrt{d+e\,x^2}}{3\,d\sqrt{x}}+\frac{4\sqrt{-e^2}\sqrt{x}\sqrt{d+e\,x^2}}{3\,d\left(\sqrt{d}+\sqrt{e}\,x\right)}-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]}{3\,x^{3/2}}-\frac{4\sqrt{-e}\,e^{1/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{3\,d^{3/4}\sqrt{d+e\,x^2}}+\frac{2\sqrt{-e}\,e^{1/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{3\,d^{3/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 234 leaves):

$$\left(-2\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\left(2\sqrt{-e}\,x\left(d+e\,x^2\right)+d\sqrt{d+e\,x^2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]\right)+4\sqrt{d}\sqrt{-e^2}\,x^2\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]-4\sqrt{d}\sqrt{-e^2}\,x^2\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\bigg/\left(3\,d\,x^{3/2}\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\right)$$

Problem 29: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]}{x^{9/2}}\,dx$$

Optimal (type 4, 331 leaves, 7 steps):

$$-\frac{4\sqrt{-e}\sqrt{d+e\,x^2}}{35\,d\,x^{5/2}}-\frac{12\,(-e)^{3/2}\sqrt{d+e\,x^2}}{35\,d^2\sqrt{x}}-\frac{12\sqrt{-e}\,e^{3/2}\sqrt{x}\sqrt{d+e\,x^2}}{35\,d^2\left(\sqrt{d}+\sqrt{e}\,x\right)}-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]}{7\,x^{7/2}}+\frac{12\sqrt{-e}\,e^{5/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticE}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{35\,d^{7/4}\sqrt{d+e\,x^2}}-\frac{6\sqrt{-e}\,e^{5/4}\left(\sqrt{d}+\sqrt{e}\,x\right)\sqrt{\frac{d+e\,x^2}{\left(\sqrt{d}+\sqrt{e}\,x\right)^2}}\,\text{EllipticF}\left[2\,\text{ArcTan}\left[\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right],\frac{1}{2}\right]}{35\,d^{7/4}\sqrt{d+e\,x^2}}$$

Result (type 4, 256 leaves):

$$\left(2\left(\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\left(2\sqrt{-e}\,x\left(-d^2+2\,d\,e\,x^2+3\,e^2\,x^4\right)-5\,d^2\sqrt{d+e\,x^2}\,\text{ArcTan}\left[\frac{\sqrt{-e}\,x}{\sqrt{d+e\,x^2}}\right]\right)+6\sqrt{d}\,(-e)^{3/2}\sqrt{e}\,x^4\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]+6\sqrt{d}\sqrt{-e}\,e^{3/2}\,x^4\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\right],-1\right]\right)\right)\bigg/\left(35\,d^2\,x^{7/2}\sqrt{\frac{i\sqrt{e}\,x}{\sqrt{d}}}\sqrt{d+e\,x^2}\right)$$

Problem 32: Unable to integrate problem.

$$\int \frac{\left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right)^3}{1-c^2 x^2} \, dx$$

Optimal (type 4, 431 leaves, 9 steps):

$$-\frac{2 \left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right)^3 \operatorname{ArcTanh}\left[1-\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{c}+\frac{3 i b \left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right)^2 \operatorname{PolyLog}\left[2,1-\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{2 c}-\frac{3 i b \left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right)^2 \operatorname{PolyLog}\left[2,-1+\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{2 c}+\frac{3 b^2 \left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right) \operatorname{PolyLog}\left[3,1-\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{2 c}-\frac{3 b^2 \left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right) \operatorname{PolyLog}\left[3,-1+\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{2 c}-\frac{3 i b^3 \operatorname{PolyLog}\left[4,1-\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{4 c}+\frac{3 i b^3 \operatorname{PolyLog}\left[4,-1+\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{4 c}$$

Result (type 8, 42 leaves):

$$\int \frac{\left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right)^3}{1-c^2 x^2} \, dx$$

Problem 33: Unable to integrate problem.

$$\int \frac{\left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right)^2}{1-c^2 x^2} \, dx$$

Optimal (type 4, 283 leaves, 7 steps):

$$-\frac{2 \left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right)^2 \operatorname{ArcTanh}\left[1-\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{c}+\frac{i b \left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right) \operatorname{PolyLog}\left[2,1-\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{c}-\frac{i b \left(a+b \operatorname{ArcTan}\left[\frac{\sqrt{1-c x}}{\sqrt{1+c x}}\right]\right) \operatorname{PolyLog}\left[2,-1+\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{c}+\frac{b^2 \operatorname{PolyLog}\left[3,1-\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{2 c}-\frac{b^2 \operatorname{PolyLog}\left[3,-1+\frac{2}{1+\frac{i \sqrt{1-c x}}{\sqrt{1+c x}}}\right]}{2 c}$$

Result (type 8, 42 leaves):

$$\int \frac{\left(a+b\,\text{ArcTan}\left[\frac{\sqrt{1-c\,x}}{\sqrt{1+c\,x}}\right]\right)^2}{1-c^2\,x^2}\,dx$$

Problem 50: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTan}[c+d\,\text{Tan}[a+b\,x]]\,dx$$

Optimal (type 4, 198 leaves, 7 steps):

$$x\,\text{ArcTan}[c+d\,\text{Tan}[a+b\,x]]+\frac{1}{2}\,i\,x\,\text{Log}\left[1+\frac{(1+i\,c+d)\,e^{2\,i\,a+2\,i\,b\,x}}{1+i\,c-d}\right]-\frac{1}{2}\,i\,x\,\text{Log}\left[1+\frac{(c+i\,(1-d))\,e^{2\,i\,a+2\,i\,b\,x}}{c+i\,(1+d)}\right]+\frac{\text{PolyLog}\left[2,-\frac{(1+i\,c+d)\,e^{2\,i\,a+2\,i\,b\,x}}{1+i\,c-d}\right]}{4\,b}-\frac{\text{PolyLog}\left[2,-\frac{(c+i\,(1-d))\,e^{2\,i\,a+2\,i\,b\,x}}{c+i\,(1+d)}\right]}{4\,b}$$

Result (type 4, 418 leaves):

$$x\,\text{ArcTan}[c+d\,\text{Tan}[a+b\,x]]+\frac{1}{4\,b}\left(2\,a\,\text{ArcTan}\left[\frac{c\,\left(1+e^{2\,i\,(a+b\,x)}\right)}{1+d+e^{2\,i\,(a+b\,x)}-d\,e^{2\,i\,(a+b\,x)}}\right]+2\,a\,\text{ArcTan}\left[\frac{c\,\left(1+e^{2\,i\,(a+b\,x)}\right)}{1+e^{2\,i\,(a+b\,x)}+d\,\left(-1+e^{2\,i\,(a+b\,x)}\right)}\right]+2\,i\,(a+b\,x)\,\text{Log}\left[1+\frac{(c-i\,(1+d))\,e^{2\,i\,(a+b\,x)}}{c+i\,(-1+d)}\right]-\right.$$
$$2\,i\,(a+b\,x)\,\text{Log}\left[1+\frac{(i+c-i\,d)\,e^{2\,i\,(a+b\,x)}}{c+i\,(1+d)}\right]+i\,a\,\text{Log}\left[e^{-4\,i\,(a+b\,x)}\left(c^2\,\left(1+e^{2\,i\,(a+b\,x)}\right)^2+\left(1+d+e^{2\,i\,(a+b\,x)}-d\,e^{2\,i\,(a+b\,x)}\right)^2\right)\right]-$$
$$i\,a\,\text{Log}\left[e^{-4\,i\,(a+b\,x)}\left(c^2\,\left(1+e^{2\,i\,(a+b\,x)}\right)^2+\left(1+e^{2\,i\,(a+b\,x)}+d\,\left(-1+e^{2\,i\,(a+b\,x)}\right)\right)^2\right)\right]+$$
$$\left.\text{PolyLog}\left[2,-\frac{(c-i\,(1+d))\,e^{2\,i\,(a+b\,x)}}{c+i\,(-1+d)}\right]-\text{PolyLog}\left[2,-\frac{(i+c-i\,d)\,e^{2\,i\,(a+b\,x)}}{c+i\,(1+d)}\right]\right)$$

Problem 63: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTan}[c+d\,\text{Cot}[a+b\,x]]\,dx$$

Optimal (type 4, 198 leaves, 7 steps):

$$x\,\text{ArcTan}[c+d\,\text{Cot}[a+b\,x]]+\frac{1}{2}\,i\,x\,\text{Log}\left[1-\frac{(1+i\,c-d)\,e^{2\,i\,a+2\,i\,b\,x}}{1+i\,c+d}\right]-\frac{1}{2}\,i\,x\,\text{Log}\left[1-\frac{(c+i\,(1+d))\,e^{2\,i\,a+2\,i\,b\,x}}{c+i\,(1-d)}\right]+\frac{\text{PolyLog}\left[2,\frac{(1+i\,c-d)\,e^{2\,i\,a+2\,i\,b\,x}}{1+i\,c+d}\right]}{4\,b}-\frac{\text{PolyLog}\left[2,\frac{(c+i\,(1+d))\,e^{2\,i\,a+2\,i\,b\,x}}{c+i\,(1-d)}\right]}{4\,b}$$

Result (type 4, 416 leaves):

$$x\,\text{ArcTan}[c+d\,\text{Cot}[a+b\,x]]+\frac{1}{4\,b}\Bigg(2\,a\,\text{ArcTan}\Big[\frac{c\,(-1+e^{-2\,i\,(a+b\,x)})}{-1+d+e^{-2\,i\,(a+b\,x)}+d\,e^{-2\,i\,(a+b\,x)}}\Big]+2\,a\,\text{ArcTan}\Big[\frac{c\,(-1+e^{2\,i\,(a+b\,x)})}{-1+d+e^{2\,i\,(a+b\,x)}+d\,e^{2\,i\,(a+b\,x)}}\Big]+2\,i\,(a+b\,x)\,\text{Log}\Big[1-\frac{(c+i\,(-1+d))\,e^{2\,i\,(a+b\,x)}}{c-i\,(1+d)}\Big]-$$
$$2\,i\,(a+b\,x)\,\text{Log}\Big[1-\frac{(c+i\,(1+d))\,e^{2\,i\,(a+b\,x)}}{i+c-i\,d}\Big]-i\,a\,\text{Log}\Big[e^{-4\,i\,(a+b\,x)}\Big(c^2\,(-1+e^{2\,i\,(a+b\,x)})^2+(1+d-e^{2\,i\,(a+b\,x)}+d\,e^{2\,i\,(a+b\,x)})^2\Big)\Big]+$$
$$i\,a\,\text{Log}\Big[e^{-4\,i\,(a+b\,x)}\Big(c^2\,(-1+e^{2\,i\,(a+b\,x)})^2+(-1+d+e^{2\,i\,(a+b\,x)}+d\,e^{2\,i\,(a+b\,x)})^2\Big)\Big]+$$
$$\text{PolyLog}\Big[2,\frac{(c+i\,(-1+d))\,e^{2\,i\,(a+b\,x)}}{c-i\,(1+d)}\Big]-\text{PolyLog}\Big[2,\frac{(c+i\,(1+d))\,e^{2\,i\,(a+b\,x)}}{i+c-i\,d}\Big]\Bigg)$$

Problem 75: Result more than twice size of optimal antiderivative.

$$\int x^2\,\text{ArcTan}[\text{Sinh}[x]]\,dx$$

Optimal (type 4, 108 leaves, 10 steps):

$$-\frac{2}{3}x^3\,\text{ArcTan}[e^x]+\frac{1}{3}x^3\,\text{ArcTan}[\text{Sinh}[x]]+i\,x^2\,\text{PolyLog}[2,-i\,e^x]-i\,x^2\,\text{PolyLog}[2,i\,e^x]-$$
$$2\,i\,x\,\text{PolyLog}[3,-i\,e^x]+2\,i\,x\,\text{PolyLog}[3,i\,e^x]+2\,i\,\text{PolyLog}[4,-i\,e^x]-2\,i\,\text{PolyLog}[4,i\,e^x]$$

Result (type 4, 356 leaves):

$$\frac{1}{192}\,i\,\Big(7\,\pi^4+8\,i\,\pi^3\,x+24\,\pi^2\,x^2-32\,i\,\pi\,x^3-16\,x^4-64\,i\,x^3\,\text{ArcTan}[\text{Sinh}[x]]+8\,i\,\pi^3\,\text{Log}[1+i\,e^{-x}]+48\,\pi^2\,x\,\text{Log}[1+i\,e^{-x}]-96\,i\,\pi\,x^2\,\text{Log}[1+i\,e^{-x}]-$$
$$64\,x^3\,\text{Log}[1+i\,e^{-x}]-48\,\pi^2\,x\,\text{Log}[1-i\,e^x]+96\,i\,\pi\,x^2\,\text{Log}[1-i\,e^x]-8\,i\,\pi^3\,\text{Log}[1+i\,e^x]+64\,x^3\,\text{Log}[1+i\,e^x]+8\,i\,\pi^3\,\text{Log}\Big[\text{Tan}\Big[\frac{1}{4}(\pi+2\,i\,x)\Big]\Big]-$$
$$48\,(\pi-2\,i\,x)^2\,\text{PolyLog}[2,-i\,e^{-x}]+192\,x^2\,\text{PolyLog}[2,-i\,e^x]-48\,\pi^2\,\text{PolyLog}[2,i\,e^x]+192\,i\,\pi\,x\,\text{PolyLog}[2,i\,e^x]+192\,i\,\pi\,\text{PolyLog}[3,-i\,e^{-x}]+$$
$$384\,x\,\text{PolyLog}[3,-i\,e^{-x}]-384\,x\,\text{PolyLog}[3,-i\,e^x]-192\,i\,\pi\,\text{PolyLog}[3,i\,e^x]+384\,\text{PolyLog}[4,-i\,e^{-x}]+384\,\text{PolyLog}[4,-i\,e^x]\Big)$$

Problem 76: Result more than twice size of optimal antiderivative.

$$\int (e+f\,x)^3\,\text{ArcTan}[\text{Tanh}[a+b\,x]]\,dx$$

Optimal (type 4, 299 leaves, 12 steps):

$$-\frac{(e+fx)^4\,\text{ArcTan}\left[e^{2a+2bx}\right]}{4f}+\frac{(e+fx)^4\,\text{ArcTan}[\text{Tanh}[a+bx]]}{4f}+\frac{i\,(e+fx)^3\,\text{PolyLog}\left[2,-i\,e^{2a+2bx}\right]}{4b}-\frac{i\,(e+fx)^3\,\text{PolyLog}\left[2,i\,e^{2a+2bx}\right]}{4b}-\frac{3\,i\,f\,(e+fx)^2\,\text{PolyLog}\left[3,-i\,e^{2a+2bx}\right]}{8b^2}+\frac{3\,i\,f\,(e+fx)^2\,\text{PolyLog}\left[3,i\,e^{2a+2bx}\right]}{8b^2}+\frac{3\,i\,f^2\,(e+fx)\,\text{PolyLog}\left[4,-i\,e^{2a+2bx}\right]}{8b^3}-\frac{3\,i\,f^2\,(e+fx)\,\text{PolyLog}\left[4,i\,e^{2a+2bx}\right]}{8b^3}-\frac{3\,i\,f^3\,\text{PolyLog}\left[5,-i\,e^{2a+2bx}\right]}{16b^4}+\frac{3\,i\,f^3\,\text{PolyLog}\left[5,i\,e^{2a+2bx}\right]}{16b^4}$$

Result (type 4, 600 leaves):

$$\frac{1}{4}x\left(4e^3+6e^2fx+4ef^2x^2+f^3x^3\right)\text{ArcTan}[\text{Tanh}[a+bx]]-\frac{1}{16b^4}i\left(8b^4e^3x\,\text{Log}\left[1-i\,e^{2(a+bx)}\right]+12b^4e^2fx^2\,\text{Log}\left[1-i\,e^{2(a+bx)}\right]+8b^4ef^2x^3\,\text{Log}\left[1-i\,e^{2(a+bx)}\right]+2b^4f^3x^4\,\text{Log}\left[1-i\,e^{2(a+bx)}\right]-8b^4e^3x\,\text{Log}\left[1+i\,e^{2(a+bx)}\right]-12b^4e^2fx^2\,\text{Log}\left[1+i\,e^{2(a+bx)}\right]-8b^4ef^2x^3\,\text{Log}\left[1+i\,e^{2(a+bx)}\right]-2b^4f^3x^4\,\text{Log}\left[1+i\,e^{2(a+bx)}\right]-4b^3(e+fx)^3\,\text{PolyLog}\left[2,-i\,e^{2(a+bx)}\right]+4b^3(e+fx)^3\,\text{PolyLog}\left[2,i\,e^{2(a+bx)}\right]+6b^2e^2f\,\text{PolyLog}\left[3,-i\,e^{2(a+bx)}\right]+12b^2ef^2x\,\text{PolyLog}\left[3,-i\,e^{2(a+bx)}\right]+6b^2f^3x^2\,\text{PolyLog}\left[3,-i\,e^{2(a+bx)}\right]-6b^2e^2f\,\text{PolyLog}\left[3,i\,e^{2(a+bx)}\right]-12b^2ef^2x\,\text{PolyLog}\left[3,i\,e^{2(a+bx)}\right]-6b^2f^3x^2\,\text{PolyLog}\left[3,i\,e^{2(a+bx)}\right]-6bef^2\,\text{PolyLog}\left[4,-i\,e^{2(a+bx)}\right]-6bf^3x\,\text{PolyLog}\left[4,-i\,e^{2(a+bx)}\right]+6bef^2\,\text{PolyLog}\left[4,i\,e^{2(a+bx)}\right]+6bf^3x\,\text{PolyLog}\left[4,i\,e^{2(a+bx)}\right]+3f^3\,\text{PolyLog}\left[5,-i\,e^{2(a+bx)}\right]-3f^3\,\text{PolyLog}\left[5,i\,e^{2(a+bx)}\right]\right)$$

Problem 83: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTan}[c+d\,\text{Tanh}[a+bx]]\,dx$$

Optimal (type 4, 174 leaves, 7 steps):

$$x\,\text{ArcTan}[c+d\,\text{Tanh}[a+bx]]+\frac{1}{2}i\,x\,\text{Log}\left[1+\frac{(i-c-d)\,e^{2a+2bx}}{i-c+d}\right]-\frac{1}{2}i\,x\,\text{Log}\left[1+\frac{(i+c+d)\,e^{2a+2bx}}{i+c-d}\right]+\frac{i\,\text{PolyLog}\left[2,-\frac{(i-c-d)\,e^{2a+2bx}}{i-c+d}\right]}{4b}-\frac{i\,\text{PolyLog}\left[2,-\frac{(i+c+d)\,e^{2a+2bx}}{i+c-d}\right]}{4b}$$

Result (type 4, 365 leaves):

$$x\,\text{ArcTan}[c+d\,\text{Tanh}[a+b\,x]]+\frac{1}{2b}\,i\left(2\,i\,a\,\text{ArcTan}\left[\frac{1+e^{2(a+b\,x)}}{c-d+c\,e^{2(a+b\,x)}+d\,e^{2(a+b\,x)}}\right]+(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{-i+c+d}\;e^{a+b\,x}}{\sqrt{i-c+d}}\right]+(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{-i+c+d}\;e^{a+b\,x}}{\sqrt{i-c+d}}\right]-(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{i+c+d}\;e^{a+b\,x}}{\sqrt{-i-c+d}}\right]-(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{i+c+d}\;e^{a+b\,x}}{\sqrt{-i-c+d}}\right]+\text{PolyLog}\left[2,-\frac{\sqrt{-i+c+d}\;e^{a+b\,x}}{\sqrt{i-c+d}}\right]+\text{PolyLog}\left[2,\frac{\sqrt{-i+c+d}\;e^{a+b\,x}}{\sqrt{i-c+d}}\right]-\text{PolyLog}\left[2,-\frac{\sqrt{i+c+d}\;e^{a+b\,x}}{\sqrt{-i-c+d}}\right]-\text{PolyLog}\left[2,\frac{\sqrt{i+c+d}\;e^{a+b\,x}}{\sqrt{-i-c+d}}\right]\right)$$

Problem 93: Result more than twice size of optimal antiderivative.

$$\int (e+f\,x)^3\,\text{ArcTan}[\text{Coth}[a+b\,x]]\,dx$$

Optimal (type 4, 299 leaves, 12 steps):

$$\frac{(e+f\,x)^4\,\text{ArcTan}\left[e^{2a+2b\,x}\right]}{4f}+\frac{(e+f\,x)^4\,\text{ArcTan}[\text{Coth}[a+b\,x]]}{4f}-\frac{i\,(e+f\,x)^3\,\text{PolyLog}\left[2,-i\,e^{2a+2b\,x}\right]}{4b}+\frac{i\,(e+f\,x)^3\,\text{PolyLog}\left[2,i\,e^{2a+2b\,x}\right]}{4b}+\frac{3\,i\,f\,(e+f\,x)^2\,\text{PolyLog}\left[3,-i\,e^{2a+2b\,x}\right]}{8b^2}-\frac{3\,i\,f\,(e+f\,x)^2\,\text{PolyLog}\left[3,i\,e^{2a+2b\,x}\right]}{8b^2}-\frac{3\,i\,f^2\,(e+f\,x)\,\text{PolyLog}\left[4,-i\,e^{2a+2b\,x}\right]}{8b^3}+\frac{3\,i\,f^2\,(e+f\,x)\,\text{PolyLog}\left[4,i\,e^{2a+2b\,x}\right]}{8b^3}+\frac{3\,i\,f^3\,\text{PolyLog}\left[5,-i\,e^{2a+2b\,x}\right]}{16b^4}-\frac{3\,i\,f^3\,\text{PolyLog}\left[5,i\,e^{2a+2b\,x}\right]}{16b^4}$$

Result (type 4, 600 leaves):

$$\frac{1}{4}x\left(4e^3+6e^2f\,x+4e\,f^2x^2+f^3x^3\right)\text{ArcTan}[\text{Coth}[a+b\,x]]+\frac{1}{16b^4}\,i\left(8b^4e^3x\,\text{Log}\left[1-i\,e^{2(a+b\,x)}\right]+12b^4e^2f\,x^2\,\text{Log}\left[1-i\,e^{2(a+b\,x)}\right]+8b^4e\,f^2x^3\,\text{Log}\left[1-i\,e^{2(a+b\,x)}\right]+2b^4f^3x^4\,\text{Log}\left[1-i\,e^{2(a+b\,x)}\right]-8b^4e^3x\,\text{Log}\left[1+i\,e^{2(a+b\,x)}\right]-12b^4e^2f\,x^2\,\text{Log}\left[1+i\,e^{2(a+b\,x)}\right]-8b^4e\,f^2x^3\,\text{Log}\left[1+i\,e^{2(a+b\,x)}\right]-2b^4f^3x^4\,\text{Log}\left[1+i\,e^{2(a+b\,x)}\right]-4b^3(e+f\,x)^3\,\text{PolyLog}\left[2,-i\,e^{2(a+b\,x)}\right]+4b^3(e+f\,x)^3\,\text{PolyLog}\left[2,i\,e^{2(a+b\,x)}\right]+6b^2e^2f\,\text{PolyLog}\left[3,-i\,e^{2(a+b\,x)}\right]+12b^2e\,f^2x\,\text{PolyLog}\left[3,-i\,e^{2(a+b\,x)}\right]+6b^2f^3x^2\,\text{PolyLog}\left[3,-i\,e^{2(a+b\,x)}\right]-6b^2e^2f\,\text{PolyLog}\left[3,i\,e^{2(a+b\,x)}\right]-12b^2e\,f^2x\,\text{PolyLog}\left[3,i\,e^{2(a+b\,x)}\right]-6b^2f^3x^2\,\text{PolyLog}\left[3,i\,e^{2(a+b\,x)}\right]-6b\,e\,f^2\,\text{PolyLog}\left[4,-i\,e^{2(a+b\,x)}\right]-6b\,f^3x\,\text{PolyLog}\left[4,-i\,e^{2(a+b\,x)}\right]+6b\,e\,f^2\,\text{PolyLog}\left[4,i\,e^{2(a+b\,x)}\right]+6b\,f^3x\,\text{PolyLog}\left[4,i\,e^{2(a+b\,x)}\right]+3f^3\,\text{PolyLog}\left[5,-i\,e^{2(a+b\,x)}\right]-3f^3\,\text{PolyLog}\left[5,i\,e^{2(a+b\,x)}\right]\right)$$

Problem 100: Result more than twice size of optimal antiderivative.

$$\int \text{ArcTan}[c+d\,\text{Coth}[a+b\,x]]\,dx$$

Optimal (type 4, 174 leaves, 7 steps):

$$x\,\text{ArcTan}[c+d\,\text{Coth}[a+b\,x]]+\frac{1}{2}\,i\,x\,\text{Log}\left[1-\frac{(i-c-d)\,e^{2a+2bx}}{i-c+d}\right]-\frac{1}{2}\,i\,x\,\text{Log}\left[1-\frac{(i+c+d)\,e^{2a+2bx}}{i+c-d}\right]+\frac{i\,\text{PolyLog}\left[2,\frac{(i-c-d)\,e^{2a+2bx}}{i-c+d}\right]}{4b}-\frac{i\,\text{PolyLog}\left[2,\frac{(i+c+d)\,e^{2a+2bx}}{i+c-d}\right]}{4b}$$

Result (type 4, 365 leaves):

$$x\,\text{ArcTan}[c+d\,\text{Coth}[a+b\,x]]+\frac{1}{2b}\,i\left(2\,i\,a\,\text{ArcTan}\left[\frac{-1+e^{2(a+bx)}}{-c+d+c\,e^{2(a+bx)}+d\,e^{2(a+bx)}}\right]+(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{-i+c+d}\,e^{a+bx}}{\sqrt{-i+c-d}}\right]+(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{-i+c+d}\,e^{a+bx}}{\sqrt{-i+c-d}}\right]-(a+b\,x)\,\text{Log}\left[1-\frac{\sqrt{i+c+d}\,e^{a+bx}}{\sqrt{i+c-d}}\right]-(a+b\,x)\,\text{Log}\left[1+\frac{\sqrt{i+c+d}\,e^{a+bx}}{\sqrt{i+c-d}}\right]+\text{PolyLog}\left[2,-\frac{\sqrt{-i+c+d}\,e^{a+bx}}{\sqrt{-i+c-d}}\right]+\text{PolyLog}\left[2,\frac{\sqrt{-i+c+d}\,e^{a+bx}}{\sqrt{-i+c-d}}\right]-\text{PolyLog}\left[2,-\frac{\sqrt{i+c+d}\,e^{a+bx}}{\sqrt{i+c-d}}\right]-\text{PolyLog}\left[2,\frac{\sqrt{i+c+d}\,e^{a+bx}}{\sqrt{i+c-d}}\right]\right)$$

Problem 116: Attempted integration timed out after 120 seconds.

$$\int \text{ArcTan}\left[a+b\,f^{c+d\,x}\right]\,dx$$

Optimal (type 4, 196 leaves, 6 steps):

$$-\frac{\text{ArcTan}\left[a+b\,f^{c+dx}\right]\,\text{Log}\left[\frac{2}{1-i\,(a+b\,f^{c+dx})}\right]}{d\,\text{Log}[f]}+\frac{\text{ArcTan}\left[a+b\,f^{c+dx}\right]\,\text{Log}\left[\frac{2\,b\,f^{c+dx}}{(i-a)\,(1-i\,(a+b\,f^{c+dx}))}\right]}{d\,\text{Log}[f]}+\frac{i\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,(a+b\,f^{c+dx})}\right]}{2\,d\,\text{Log}[f]}-\frac{i\,\text{PolyLog}\left[2,1-\frac{2\,b\,f^{c+dx}}{(i-a)\,(1-i\,(a+b\,f^{c+dx}))}\right]}{2\,d\,\text{Log}[f]}$$

Result (type 1, 1 leaves):

???

Problem 117: Unable to integrate problem.

$$\int x\,\text{ArcTan}\left[a+b\,f^{c+d\,x}\right]\,dx$$

Optimal (type 4, 232 leaves, 9 steps):

$$\frac{1}{2}x^2 \text{ArcTan}\left[a+b\,f^{c+d\,x}\right]-\frac{1}{4}\,i\,x^2 \text{Log}\left[1-\frac{i\,b\,f^{c+d\,x}}{1-i\,a}\right]+\frac{1}{4}\,i\,x^2 \text{Log}\left[1+\frac{i\,b\,f^{c+d\,x}}{1+i\,a}\right]-$$
$$\frac{i\,x\,\text{PolyLog}\left[2,\frac{i\,b\,f^{c+d\,x}}{1-i\,a}\right]}{2\,d\,\text{Log}[f]}+\frac{i\,x\,\text{PolyLog}\left[2,-\frac{i\,b\,f^{c+d\,x}}{1+i\,a}\right]}{2\,d\,\text{Log}[f]}+\frac{i\,\text{PolyLog}\left[3,\frac{i\,b\,f^{c+d\,x}}{1-i\,a}\right]}{2\,d^2\,\text{Log}[f]^2}-\frac{i\,\text{PolyLog}\left[3,-\frac{i\,b\,f^{c+d\,x}}{1+i\,a}\right]}{2\,d^2\,\text{Log}[f]^2}$$

Result (type 8, 16 leaves) :

$$\int x\,\text{ArcTan}\left[a+b\,f^{c+d\,x}\right]\,dx$$

Problem 118: Unable to integrate problem.

$$\int x^2\,\text{ArcTan}\left[a+b\,f^{c+d\,x}\right]\,dx$$

Optimal (type 4, 302 leaves, 11 steps) :

$$\frac{1}{3}x^3 \text{ArcTan}\left[a+b\,f^{c+d\,x}\right]-\frac{1}{6}\,i\,x^3 \text{Log}\left[1-\frac{i\,b\,f^{c+d\,x}}{1-i\,a}\right]+\frac{1}{6}\,i\,x^3 \text{Log}\left[1+\frac{i\,b\,f^{c+d\,x}}{1+i\,a}\right]-\frac{i\,x^2\,\text{PolyLog}\left[2,\frac{i\,b\,f^{c+d\,x}}{1-i\,a}\right]}{2\,d\,\text{Log}[f]}+$$
$$\frac{i\,x^2\,\text{PolyLog}\left[2,-\frac{i\,b\,f^{c+d\,x}}{1+i\,a}\right]}{2\,d\,\text{Log}[f]}+\frac{i\,x\,\text{PolyLog}\left[3,\frac{i\,b\,f^{c+d\,x}}{1-i\,a}\right]}{d^2\,\text{Log}[f]^2}-\frac{i\,x\,\text{PolyLog}\left[3,-\frac{i\,b\,f^{c+d\,x}}{1+i\,a}\right]}{d^2\,\text{Log}[f]^2}-\frac{i\,\text{PolyLog}\left[4,\frac{i\,b\,f^{c+d\,x}}{1-i\,a}\right]}{d^3\,\text{Log}[f]^3}+\frac{i\,\text{PolyLog}\left[4,-\frac{i\,b\,f^{c+d\,x}}{1+i\,a}\right]}{d^3\,\text{Log}[f]^3}$$

Result (type 8, 18 leaves) :

$$\int x^2\,\text{ArcTan}\left[a+b\,f^{c+d\,x}\right]\,dx$$

Problem 148: Result is not expressed in closed-form.

$$\int e^{c\,(a+b\,x)}\,\text{ArcTan}[\text{Cosh}[a\,c+b\,c\,x]]\,dx$$

Optimal (type 3, 103 leaves, 8 steps) :

$$\frac{e^{a\,c+b\,c\,x}\,\text{ArcTan}[\text{Cosh}[c\,(a+b\,x)]]}{b\,c}-\frac{\left(1-\sqrt{2}\right)\,\text{Log}\left[3-2\,\sqrt{2}+e^{2\,c\,(a+b\,x)}\right]}{2\,b\,c}-\frac{\left(1+\sqrt{2}\right)\,\text{Log}\left[3+2\,\sqrt{2}+e^{2\,c\,(a+b\,x)}\right]}{2\,b\,c}$$

Result (type 7, 146 leaves) :

$$\frac{1}{2\,b\,c}\left(-4\,c\,(a+b\,x)+2\,e^{c\,(a+b\,x)}\,\text{ArcTan}\left[\frac{1}{2}\,e^{-c\,(a+b\,x)}\,\left(1+e^{2\,c\,(a+b\,x)}\right)\right]+\right.$$
$$\left.\text{RootSum}\left[1+6\,\#1^2+\#1^4\,\&,\frac{a\,c+b\,c\,x-\text{Log}\left[e^{c\,(a+b\,x)}-\#1\right]+7\,a\,c\,\#1^2+7\,b\,c\,x\,\#1^2-7\,\text{Log}\left[e^{c\,(a+b\,x)}-\#1\right]\,\#1^2}{1+3\,\#1^2}\,\&\right]\right)$$

Problem 149: Result is not expressed in closed-form.

$$\int e^{c (a+b x)} \text{ArcTan}[\text{Tanh}[a c + b c x]] \, dx$$

Optimal (type 3, 180 leaves, 13 steps):

$$\frac{\text{ArcTan}\left[1-\sqrt{2}\, e^{a c+b c x}\right]}{\sqrt{2}\, b c}-\frac{\text{ArcTan}\left[1+\sqrt{2}\, e^{a c+b c x}\right]}{\sqrt{2}\, b c}+\frac{e^{a c+b c x} \text{ArcTan}[\text{Tanh}[c (a+b x)]]}{b c}-\frac{\text{Log}\left[1+e^{2 c (a+b x)}-\sqrt{2}\, e^{a c+b c x}\right]}{2 \sqrt{2}\, b c}+\frac{\text{Log}\left[1+e^{2 c (a+b x)}+\sqrt{2}\, e^{a c+b c x}\right]}{2 \sqrt{2}\, b c}$$

Result (type 7, 89 leaves):

$$\frac{2 e^{c (a+b x)} \text{ArcTan}\left[\frac{-1+e^{2 c (a+b x)}}{1+e^{2 c (a+b x)}}\right]+\text{RootSum}\left[1+\#1^4\&, \frac{a c+b c x-\text{Log}\left[e^{c (a+b x)}-\#1\right]}{\#1}\&\right]}{2 b c}$$

Problem 150: Result is not expressed in closed-form.

$$\int e^{c (a+b x)} \text{ArcTan}[\text{Coth}[a c + b c x]] \, dx$$

Optimal (type 3, 180 leaves, 13 steps):

$$-\frac{\text{ArcTan}\left[1-\sqrt{2}\, e^{a c+b c x}\right]}{\sqrt{2}\, b c}+\frac{\text{ArcTan}\left[1+\sqrt{2}\, e^{a c+b c x}\right]}{\sqrt{2}\, b c}+\frac{e^{a c+b c x} \text{ArcTan}[\text{Coth}[c (a+b x)]]}{b c}+\frac{\text{Log}\left[1+e^{2 c (a+b x)}-\sqrt{2}\, e^{a c+b c x}\right]}{2 \sqrt{2}\, b c}-\frac{\text{Log}\left[1+e^{2 c (a+b x)}+\sqrt{2}\, e^{a c+b c x}\right]}{2 \sqrt{2}\, b c}$$

Result (type 7, 89 leaves):

$$\frac{2 e^{c (a+b x)} \text{ArcTan}\left[\frac{1+e^{2 c (a+b x)}}{-1+e^{2 c (a+b x)}}\right]+\text{RootSum}\left[1+\#1^4\&, \frac{-a c-b c x+\text{Log}\left[e^{c (a+b x)}-\#1\right]}{\#1}\&\right]}{2 b c}$$

Problem 151: Result is not expressed in closed-form.

$$\int e^{c (a+b x)} \text{ArcTan}[\text{Sech}[a c + b c x]] \, dx$$

Optimal (type 3, 103 leaves, 8 steps):

$$\frac{e^{a c+b c x} \operatorname{ArcTan}[\operatorname{Sech}[c (a+b x)]]}{b c}+\frac{\left(1-\sqrt{2}\right) \operatorname{Log}\left[3-2 \sqrt{2}+e^{2 c (a+b x)}\right]}{2 b c}+\frac{\left(1+\sqrt{2}\right) \operatorname{Log}\left[3+2 \sqrt{2}+e^{2 c (a+b x)}\right]}{2 b c}$$

Result (type 7, 145 leaves):

$$\frac{1}{2 b c}\left(4 c (a+b x)+2 e^{c (a+b x)} \operatorname{ArcTan}\left[\frac{2 e^{c (a+b x)}}{1+e^{2 c (a+b x)}}\right]+\right.$$
$$\left.\operatorname{RootSum}\left[1+6 \#1^2+\#1^4 \&, \frac{-a c-b c x+\operatorname{Log}\left[e^{c (a+b x)}-\#1\right]-7 a c \#1^2-7 b c x \#1^2+7 \operatorname{Log}\left[e^{c (a+b x)}-\#1\right] \#1^2}{1+3 \#1^2} \&\right]\right)$$

Problem 153: Result unnecessarily involves higher level functions.

$$\int \frac{(a+b \operatorname{ArcTan}[c x^n]) (d+e \operatorname{Log}[f x^m])}{x} \, dx$$

Optimal (type 4, 163 leaves, 13 steps):

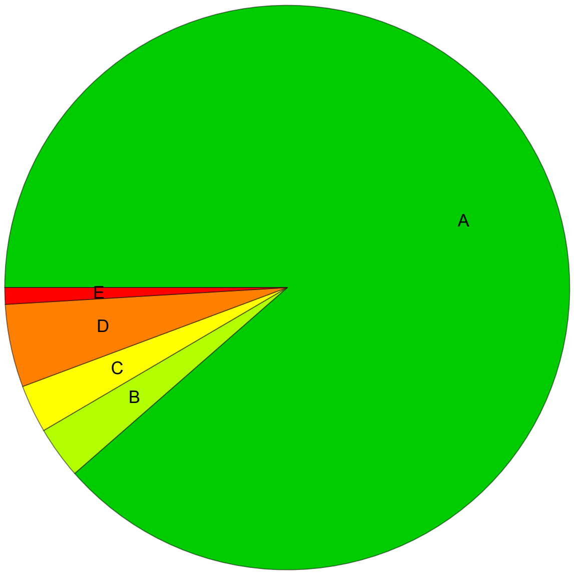
$$a d \operatorname{Log}[x]+\frac{a e \operatorname{Log}[f x^m]^2}{2 m}+\frac{i b d \operatorname{PolyLog}[2,-i c x^n]}{2 n}+\frac{i b e \operatorname{Log}[f x^m] \operatorname{PolyLog}[2,-i c x^n]}{2 n}-$$
$$\frac{i b d \operatorname{PolyLog}[2, i c x^n]}{2 n}-\frac{i b e \operatorname{Log}[f x^m] \operatorname{PolyLog}[2, i c x^n]}{2 n}-\frac{i b e m \operatorname{PolyLog}[3,-i c x^n]}{2 n^2}+\frac{i b e m \operatorname{PolyLog}[3, i c x^n]}{2 n^2}$$

Result (type 5, 116 leaves):

$$-\frac{b c e m x^n \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{2}, \frac{1}{2}, \frac{1}{2}, 1\right\}, \left\{\frac{3}{2}, \frac{3}{2}, \frac{3}{2}\right\}, -c^2 x^{2 n}\right]}{n^2}+$$
$$\frac{b c x^n \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{2}, \frac{1}{2}, 1\right\}, \left\{\frac{3}{2}, \frac{3}{2}\right\}, -c^2 x^{2 n}\right] (d+e \operatorname{Log}[f x^m])}{n}+\frac{1}{2} a \operatorname{Log}[x] \left(2 d-e m \operatorname{Log}[x]+2 e \operatorname{Log}[f x^m]\right)$$

Summary of Integration Test Results

2106 integration problems



A - 1865 optimal antiderivatives

B - 63 more than twice size of optimal antiderivatives

C - 58 unnecessarily complex antiderivatives

D - 100 unable to integrate problems

E - 20 integration timeouts