Mathematica 11.3 Integration Test Results

on the problems in the test-suite directory "5 Inverse trig functions\5.5 Inverse secant"

Test results for the 174 problems in "5.5.1 u (a+b arcsec(c x))^n.m"

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

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

Optimal (type 4, 236 leaves, 11 steps):

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

Result (type 4, 775 leaves):

$$\frac{1}{6 c^3}\left(6 a b^2 c x-3 a^2 b c^2 \sqrt{1-\frac{1}{c^2 x^2}}\, x^2+2 a^3 c^3 x^3+6 b^3 c x \operatorname{ArcSec}[c x]-6 a b^2 c^2 \sqrt{1-\frac{1}{c^2 x^2}}\, x^2 \operatorname{ArcSec}[c x]+6 a^2 b c^3 x^3 \operatorname{ArcSec}[c x]-\right.$$
$$3 b^3 c^2 \sqrt{1-\frac{1}{c^2 x^2}}\, x^2 \operatorname{ArcSec}[c x]^2+6 a b^2 c^3 x^3 \operatorname{ArcSec}[c x]^2+2 b^3 c^3 x^3 \operatorname{ArcSec}[c x]^3-6 a b^2 \operatorname{ArcSec}[c x] \operatorname{Log}\left[1-i e^{i \operatorname{ArcSec}[c x]}\right]-$$
$$3 b^3 \operatorname{ArcSec}[c x]^2 \operatorname{Log}\left[1-i e^{i \operatorname{ArcSec}[c x]}\right]+6 a b^2 \operatorname{ArcSec}[c x] \operatorname{Log}\left[1+i e^{i \operatorname{ArcSec}[c x]}\right]+3 b^3 \operatorname{ArcSec}[c x]^2 \operatorname{Log}\left[1+i e^{i \operatorname{ArcSec}[c x]}\right]-$$
$$3 b^3 \pi \operatorname{ArcSec}[c x] \operatorname{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right) e^{-\frac{1}{2} i \operatorname{ArcSec}[c x]}\left(-i+e^{i \operatorname{ArcSec}[c x]}\right)\right]+3 b^3 \operatorname{ArcSec}[c x]^2 \operatorname{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right) e^{-\frac{1}{2} i \operatorname{ArcSec}[c x]}\left(-i+e^{i \operatorname{ArcSec}[c x]}\right)\right]-$$
$$3 b^3 \pi \operatorname{ArcSec}[c x] \operatorname{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \operatorname{ArcSec}[c x]}\left((1+i)+(1-i) e^{i \operatorname{ArcSec}[c x]}\right)\right]-3 b^3 \operatorname{ArcSec}[c x]^2 \operatorname{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \operatorname{ArcSec}[c x]}\left((1+i)+(1-i) e^{i \operatorname{ArcSec}[c x]}\right)\right]-$$
$$3 a^2 b \operatorname{Log}\left[\left(1+\sqrt{1-\frac{1}{c^2 x^2}}\right) x\right]+6 b^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]-\operatorname{Sin}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]\right]-$$
$$3 b^3 \operatorname{ArcSec}[c x]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]-\operatorname{Sin}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]\right]+3 b^3 \pi \operatorname{ArcSec}[c x] \operatorname{Log}\left[-\operatorname{Cos}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]+\operatorname{Sin}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]\right]-$$
$$6 b^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]+\operatorname{Sin}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]\right]+3 b^3 \pi \operatorname{ArcSec}[c x] \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]+\operatorname{Sin}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]\right]+$$
$$3 b^3 \operatorname{ArcSec}[c x]^2 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]+\operatorname{Sin}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]\right]-6 i b^2 (a+b \operatorname{ArcSec}[c x]) \operatorname{PolyLog}\left[2,-i e^{i \operatorname{ArcSec}[c x]}\right]+$$
$$\left.6 i b^2 (a+b \operatorname{ArcSec}[c x]) \operatorname{PolyLog}\left[2, i e^{i \operatorname{ArcSec}[c x]}\right]+6 b^3 \operatorname{PolyLog}\left[3,-i e^{i \operatorname{ArcSec}[c x]}\right]-6 b^3 \operatorname{PolyLog}\left[3, i e^{i \operatorname{ArcSec}[c x]}\right]\right)$$

Problem 63: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 372 leaves, 22 steps):

$$\frac{4 b e \sqrt{d+e x}\left(1-c^2 x^2\right)}{15 c^3 \sqrt{1-\frac{1}{c^2 x^2}}\, x}+\frac{2 (d+e x)^{5/2} (a+b \text{ArcSec}[c x])}{5 e}+\frac{28 b d \sqrt{d+e x} \sqrt{1-c^2 x^2}\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{1-c x}}{\sqrt{2}}\right],\frac{2 e}{c d+e}\right]}{15 c^2 \sqrt{1-\frac{1}{c^2 x^2}}\, x \sqrt{\frac{c (d+e x)}{c d+e}}}+$$

$$\frac{4 b \left(2 c^2 d^2+e^2\right) \sqrt{\frac{c (d+e x)}{c d+e}} \sqrt{1-c^2 x^2}\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{1-c x}}{\sqrt{2}}\right],\frac{2 e}{c d+e}\right]}{15 c^4 \sqrt{1-\frac{1}{c^2 x^2}}\, x \sqrt{d+e x}}+\frac{4 b d^3 \sqrt{\frac{c (d+e x)}{c d+e}} \sqrt{1-c^2 x^2}\, \text{EllipticPi}\left[2,\text{ArcSin}\left[\frac{\sqrt{1-c x}}{\sqrt{2}}\right],\frac{2 e}{c d+e}\right]}{5 c e \sqrt{1-\frac{1}{c^2 x^2}}\, x \sqrt{d+e x}}$$

Result (type 4, 333 leaves) :

$$\frac{1}{15}\left(-\frac{4 b e \sqrt{1-\frac{1}{c^2 x^2}}\, x \sqrt{d+e x}}{c}+\frac{6 a (d+e x)^{5/2}}{e}+\frac{6 b (d+e x)^{5/2} \text{ArcSec}[c x]}{e}+\right.$$

$$\left(4 i b \sqrt{\frac{e (1+c x)}{-c d+e}} \sqrt{\frac{e-c e x}{c d+e}} \left(-7 c d (c d-e)\, \text{EllipticE}\left[i\, \text{ArcSinh}\left[\sqrt{-\frac{c}{c d+e}} \sqrt{d+e x}\right],\frac{c d+e}{c d-e}\right]+\right.\right.$$

$$\left(9 c^2 d^2-7 c d e+e^2\right) \text{EllipticF}\left[i\, \text{ArcSinh}\left[\sqrt{-\frac{c}{c d+e}} \sqrt{d+e x}\right],\frac{c d+e}{c d-e}\right]-$$

$$\left.\left.\left.3 c^2 d^2\, \text{EllipticPi}\left[1+\frac{e}{c d},\, i\, \text{ArcSinh}\left[\sqrt{-\frac{c}{c d+e}} \sqrt{d+e x}\right],\frac{c d+e}{c d-e}\right]\right)\right) \Big/ \left(c^3 e \sqrt{-\frac{c}{c d+e}} \sqrt{1-\frac{1}{c^2 x^2}}\, x\right)\right)$$

Problem 64: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 315 leaves, 15 steps) :

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

$$\frac{4\,b\,d\,\sqrt{\frac{c\,(d+e\,x)}{c\,d+e}}\,\sqrt{1-c^2\,x^2}\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{1-c\,x}}{\sqrt{2}}\right],\frac{2\,e}{c\,d+e}\right]}{3\,c^2\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\,\sqrt{d+e\,x}}+\frac{4\,b\,d^2\,\sqrt{\frac{c\,(d+e\,x)}{c\,d+e}}\,\sqrt{1-c^2\,x^2}\;\text{EllipticPi}\left[2,\text{ArcSin}\left[\frac{\sqrt{1-c\,x}}{\sqrt{2}}\right],\frac{2\,e}{c\,d+e}\right]}{3\,c\,e\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\,\sqrt{d+e\,x}}$$

Result (type 4, 277 leaves) :

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

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

$$\left.\left.(2\,c\,d-e)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{c\,d+e}}\,\sqrt{d+e\,x}\right],\frac{c\,d+e}{c\,d-e}\right]-c\,d\,\text{EllipticPi}\left[1+\frac{e}{c\,d},i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{c\,d+e}}\,\sqrt{d+e\,x}\right],\frac{c\,d+e}{c\,d-e}\right]\right)\right)$$

Problem 65: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 212 leaves, 9 steps) :

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

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

Result (type 4, 212 leaves):

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

$$\left.\left(\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{c\,d+e}}\,\sqrt{d+e\,x}\right],\frac{c\,d+e}{c\,d-e}\right]-\text{EllipticPi}\left[1+\frac{e}{c\,d},i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{c\,d+e}}\,\sqrt{d+e\,x}\right],\frac{c\,d+e}{c\,d-e}\right]\right)\right)$$

Problem 67: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 298 leaves, 12 steps):

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

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

Result (type 4, 326 leaves):

$$\frac{1}{3e}2\left(-\frac{a}{(d+ex)^{3/2}}+\frac{2bce^2\sqrt{1-\frac{1}{c^2x^2}}\,x}{(c^2d^3-de^2)\sqrt{d+ex}}-\frac{b\,\text{ArcSec}[cx]}{(d+ex)^{3/2}}-\right.$$

$$\left(2\,i\,b\sqrt{\frac{e(1+cx)}{-cd+e}}\sqrt{\frac{e-cex}{cd+e}}\left(-cd\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{cd+e}}\sqrt{d+ex}\right],\frac{cd+e}{cd-e}\right]+cd\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{cd+e}}\sqrt{d+ex}\right],\right.\right.\right.$$

$$\left.\left.\left.\left.\frac{cd+e}{cd-e}\right]+(cd+e)\,\text{EllipticPi}\left[1+\frac{e}{cd},i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{cd+e}}\sqrt{d+ex}\right],\frac{cd+e}{cd-e}\right]\right)\right)\Bigg/\left(d^2\left(-\frac{c}{cd+e}\right)^{3/2}(cd+e)^2\sqrt{1-\frac{1}{c^2x^2}}\,x\right)\right)$$

Problem 68: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{a+b\,\text{ArcSec}[cx]}{(d+ex)^{7/2}}\,dx$$

Optimal (type 4, 540 leaves, 19 steps):

$$-\frac{4be(1-c^2x^2)}{15cd(c^2d^2-e^2)\sqrt{1-\frac{1}{c^2x^2}}\,x\,(d+ex)^{3/2}}-\frac{16bce(1-c^2x^2)}{15(c^2d^2-e^2)^2\sqrt{1-\frac{1}{c^2x^2}}\,x\sqrt{d+ex}}-\frac{4be(1-c^2x^2)}{5cd^2(c^2d^2-e^2)\sqrt{1-\frac{1}{c^2x^2}}\,x\sqrt{d+ex}}-$$

$$\frac{2(a+b\,\text{ArcSec}[cx])}{5e(d+ex)^{5/2}}+\frac{4b(7c^2d^2-3e^2)\sqrt{d+ex}\sqrt{1-c^2x^2}\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{1-cx}}{\sqrt{2}}\right],\frac{2e}{cd+e}\right]}{15(c^2d^3-de^2)^2\sqrt{1-\frac{1}{c^2x^2}}\,x\sqrt{\frac{c(d+ex)}{cd+e}}}-$$

$$\frac{4b\sqrt{\frac{c(d+ex)}{cd+e}}\sqrt{1-c^2x^2}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{1-cx}}{\sqrt{2}}\right],\frac{2e}{cd+e}\right]}{15d(c^2d^2-e^2)\sqrt{1-\frac{1}{c^2x^2}}\,x\sqrt{d+ex}}-\frac{4b\sqrt{\frac{c(d+ex)}{cd+e}}\sqrt{1-c^2x^2}\,\text{EllipticPi}\left[2,\text{ArcSin}\left[\frac{\sqrt{1-cx}}{\sqrt{2}}\right],\frac{2e}{cd+e}\right]}{5cd^2e\sqrt{1-\frac{1}{c^2x^2}}\,x\sqrt{d+ex}}$$

Result (type 4, 407 leaves):

$$\frac{1}{15\,e}2\left(-\frac{3\,a}{(d+e\,x)^{5/2}}+\frac{2\,b\,c\,e^2\sqrt{1-\frac{1}{c^2x^2}}\;x\left(-e^2\,(4\,d+3\,e\,x)+c^2\,d^2\,(8\,d+7\,e\,x)\right)}{\left(c^2\,d^3-d\,e^2\right)^2\,(d+e\,x)^{3/2}}-\frac{3\,b\,\text{ArcSec}[c\,x]}{(d+e\,x)^{5/2}}+\right.$$

$$\left(2\,i\,b\sqrt{\frac{e\,(1+c\,x)}{-c\,d+e}}\sqrt{\frac{e-c\,e\,x}{c\,d+e}}\left(c\,d\,\left(7\,c^2\,d^2-3\,e^2\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{c\,d+e}}\sqrt{d+e\,x}\right],\frac{c\,d+e}{c\,d-e}\right]-\right.\right.$$

$$c\,d\,\left(6\,c^2\,d^2-c\,d\,e-3\,e^2\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{c\,d+e}}\sqrt{d+e\,x}\right],\frac{c\,d+e}{c\,d-e}\right]-3\,(c\,d-e)\,(c\,d+e)^2$$

$$\left.\left.\left.\text{EllipticPi}\left[1+\frac{e}{c\,d},i\,\text{ArcSinh}\left[\sqrt{-\frac{c}{c\,d+e}}\sqrt{d+e\,x}\right],\frac{c\,d+e}{c\,d-e}\right]\right)\right)\middle/\left(d^3\,(c\,d-e)\left(-\frac{c}{c\,d+e}\right)^{3/2}(c\,d+e)^3\sqrt{1-\frac{1}{c^2\,x^2}}\;x\right)\right)$$

Problem 96: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 608 leaves, 31 steps):

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

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

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

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

Result (type 4, 1362 leaves):

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

$$\frac{\mathbb{i}\, d^{3/2} \left(-\frac{\operatorname{ArcSec}[c x]}{\mathbb{i} \sqrt{d} \sqrt{e}+e x}+\frac{\mathbb{i} \left(\frac{\operatorname{ArcSin}\left[\frac{1}{c x}\right]}{\sqrt{e}}-\frac{\operatorname{Log}\left[\frac{2 \sqrt{d} \sqrt{e} \left(\sqrt{e}+c \left(\mathbb{i} c \sqrt{d}-\sqrt{-c^2 d-e} \sqrt{1-\frac{1}{c^2 x^2}}\right) x\right)}{\sqrt{-c^2 d-e} \left(\sqrt{d}-\mathbb{i} \sqrt{e} x\right)}\right]}{\sqrt{-c^2 d-e}}\right)}{\sqrt{d}}\right)}{4 e^{5/2}}-\frac{\mathbb{i}\, d^{3/2} \left(-\frac{\operatorname{ArcSec}[c x]}{-\mathbb{i} \sqrt{d} \sqrt{e}+e x}-\frac{\mathbb{i} \left(\frac{\operatorname{ArcSin}\left[\frac{1}{c x}\right]}{\sqrt{e}}-\frac{\operatorname{Log}\left[\frac{2 \sqrt{d} \sqrt{e} \left(-\sqrt{e}+c \left(\mathbb{i} c \sqrt{d}+\sqrt{-c^2 d-e} \sqrt{1-\frac{1}{c^2 x^2}}\right) x\right)}{\sqrt{-c^2 d-e} \left(\sqrt{d}+\mathbb{i} \sqrt{e} x\right)}\right]}{\sqrt{-c^2 d-e}}\right)}{\sqrt{d}}\right)}{4 e^{5/2}}-$$

$$\frac{1}{2 e^3}\, \mathbb{i}\, d \left(8 \operatorname{ArcSin}\left[\frac{\sqrt{1+\frac{\mathbb{i} \sqrt{e}}{c \sqrt{d}}}}{\sqrt{2}}\right] \operatorname{ArcTan}\left[\frac{\left(\mathbb{i} c \sqrt{d}+\sqrt{e}\right) \operatorname{Tan}\left[\frac{1}{2} \operatorname{ArcSec}[c x]\right]}{\sqrt{c^2 d+e}}\right]-2 \mathbb{i} \operatorname{ArcSec}[c x] \operatorname{Log}\left[1+\frac{\mathbb{i} \left(\sqrt{e}-\sqrt{c^2 d+e}\right) e^{\mathbb{i} \operatorname{ArcSec}[c x]}}{c \sqrt{d}}\right]-\right.$$

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

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

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

$$\frac{1}{2\,e^3}\,i\,d\,\Bigg(8\,\text{ArcSin}\Big[\frac{\sqrt{1-\frac{i\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\Big]\,\text{ArcTan}\Big[\frac{\left(-i\,c\sqrt{d}+\sqrt{e}\right)\text{Tan}\Big[\frac{1}{2}\text{ArcSec}[c\,x]\Big]}{\sqrt{c^2 d+e}}\Big]-2\,i\,\text{ArcSec}[c\,x]\,\text{Log}\Big[1+\frac{i\left(-\sqrt{e}+\sqrt{c^2 d+e}\right)e^{i\,\text{ArcSec}[c\,x]}}{c\sqrt{d}}\Big]-$$

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

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

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

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

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

Optimal (type 4, 570 leaves, 29 steps):

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

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

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

$$\frac{i\,b\,\mathrm{PolyLog}\left[2,-\frac{c\,\sqrt{-d}\,e^{i\,\mathrm{ArcSec}[c\,x]}}{\sqrt{e}+\sqrt{c^2\,d+e}}\right]}{2\,e^2}-\frac{i\,b\,\mathrm{PolyLog}\left[2,\frac{c\,\sqrt{-d}\,e^{i\,\mathrm{ArcSec}[c\,x]}}{\sqrt{e}+\sqrt{c^2\,d+e}}\right]}{2\,e^2}+\frac{i\,b\,\mathrm{PolyLog}\left[2,-e^{2\,i\,\mathrm{ArcSec}[c\,x]}\right]}{2\,e^2}$$

Result (type 4, 1213 leaves):

$$\frac{1}{4\,e^2}$$

$$\left(\frac{2\,a\,d}{d+e\,x^2}+\frac{b\,\sqrt{d}\,\mathrm{ArcSec}[c\,x]}{\sqrt{d}-i\,\sqrt{e}\,x}+\frac{b\,\sqrt{d}\,\mathrm{ArcSec}[c\,x]}{\sqrt{d}+i\,\sqrt{e}\,x}+2\,b\,\mathrm{ArcSin}\left[\frac{1}{c\,x}\right]+8\,i\,b\,\mathrm{ArcSin}\left[\frac{\sqrt{1-\frac{i\,\sqrt{e}}{c\,\sqrt{d}}}}{\sqrt{2}}\right]\,\mathrm{ArcTan}\left[\frac{\left(-i\,c\,\sqrt{d}+\sqrt{e}\right)\,\mathrm{Tan}\left[\frac{1}{2}\,\mathrm{ArcSec}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+\right.$$

$$8\,i\,b\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{i\,\sqrt{e}}{c\,\sqrt{d}}}}{\sqrt{2}}\right]\,\mathrm{ArcTan}\left[\frac{\left(i\,c\,\sqrt{d}+\sqrt{e}\right)\,\mathrm{Tan}\left[\frac{1}{2}\,\mathrm{ArcSec}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right]+2\,b\,\mathrm{ArcSec}[c\,x]\,\mathrm{Log}\left[1+\frac{i\,\left(\sqrt{e}-\sqrt{c^2\,d+e}\right)\,e^{i\,\mathrm{ArcSec}[c\,x]}}{c\,\sqrt{d}}\right]+$$

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

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

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

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

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

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

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

Problem 98: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 131 leaves, 7 steps):

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

Result (type 3, 286 leaves):

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

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

Problem 99: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 546 leaves, 24 steps):

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

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

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

Result (type 4, 1190 leaves):

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

$$2\,b\,\text{ArcSin}\left[\frac{1}{c\,x}\right]-8\,i\,b\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right]\text{ArcTan}\left[\frac{\left(-i\,c\sqrt{d}+\sqrt{e}\right)\text{Tan}\left[\frac{1}{2}\text{ArcSec}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]-$$

$$8\,i\,b\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right]\text{ArcTan}\left[\frac{\left(i\,c\sqrt{d}+\sqrt{e}\right)\text{Tan}\left[\frac{1}{2}\text{ArcSec}[c\,x]\right]}{\sqrt{c^2 d+e}}\right]-2\,b\,\text{ArcSec}[c\,x]\,\text{Log}\left[1+\frac{i\left(\sqrt{e}-\sqrt{c^2 d+e}\right)e^{i\,\text{ArcSec}[c\,x]}}{c\sqrt{d}}\right]-$$

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

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

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

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

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

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

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

Problem 104: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 707 leaves, 33 steps):

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

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

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

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

Result (type 4, 1805 leaves):

$$-\frac{a\,d^2}{4\,e^3\,(d+e\,x^2)^2}+\frac{a\,d}{e^3\,(d+e\,x^2)}+\frac{a\,\text{Log}[d+e\,x^2]}{2\,e^3}+$$

$$
b\left(-\frac{7\,i\,\sqrt{d}\left(-\frac{\mathrm{ArcSec}[c\,x]}{i\sqrt{d}\,\sqrt{e}+e\,x}+\frac{i\left(\frac{\mathrm{ArcSin}\left[\frac{1}{c\,x}\right]}{\sqrt{e}}-\frac{\mathrm{Log}\left[\frac{2\sqrt{d}\,\sqrt{e}\,\left(\sqrt{e}+c\left(i\,c\sqrt{d}-\sqrt{-c^2\,d-e}\,\sqrt{1-\frac{1}{c^2\,x^2}}\right)x\right)}{\sqrt{-c^2\,d-e}\,\left(\sqrt{d}-i\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2\,d-e}}\right)}{\sqrt{d}}\right)}{16\,e^{5/2}}+\frac{7\,i\,\sqrt{d}\left(-\frac{\mathrm{ArcSec}[c\,x]}{-i\sqrt{d}\,\sqrt{e}+e\,x}-\frac{i\left(\frac{\mathrm{ArcSin}\left[\frac{1}{c\,x}\right]}{\sqrt{e}}-\frac{\mathrm{Log}\left[\frac{2\sqrt{d}\,\sqrt{e}\,\left(-\sqrt{e}+c\left(i\,c\sqrt{d}+\sqrt{-c^2\,d-e}\,\sqrt{1-\frac{1}{c^2\,x^2}}\right)x\right)}{\sqrt{-c^2\,d-e}\,\left(\sqrt{d}+i\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2\,d-e}}\right)}{\sqrt{d}}\right)}{16\,e^{5/2}}-\right.
$$

$$
\frac{1}{16\,e^{5/2}}d\left(-\frac{\mathrm{ArcSec}[c\,x]}{\sqrt{e}\,\left(-i\sqrt{d}+\sqrt{e}\,x\right)^2}+\frac{\frac{\mathrm{ArcSin}\left[\frac{1}{c\,x}\right]}{\sqrt{e}}-i\left(\frac{c\sqrt{d}\,\sqrt{e}\,\sqrt{1-\frac{1}{c^2\,x^2}}\,x}{\left(c^2\,d+e\right)\left(-i\sqrt{d}+\sqrt{e}\,x\right)}+\frac{\left(2\,c^2\,d+e\right)\mathrm{Log}\left[-\frac{4\,d\sqrt{e}\,\sqrt{c^2\,d+e}\,\left(i\sqrt{e}+c\left(c\sqrt{d}-\sqrt{c^2\,d+e}\,\sqrt{1-\frac{1}{c^2\,x^2}}\right)x\right)}{\left(2\,c^2\,d+e\right)\left(-i\sqrt{d}+\sqrt{e}\,x\right)}\right]}{\left(c^2\,d+e\right)^{3/2}}\right)}{d}\right)-\frac{1}{16\,e^{5/2}}
$$

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

$$\frac{1}{4 e^3} \mathrm{i} \left(8 \,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{\mathrm{i}\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right] \mathrm{ArcTan}\left[\frac{\left(\mathrm{i}\, c \sqrt{d}+\sqrt{e}\right) \mathrm{Tan}\left[\frac{1}{2} \mathrm{ArcSec}[c\, x]\right]}{\sqrt{c^2 d+e}}\right] - 2\,\mathrm{i}\, \mathrm{ArcSec}[c\, x] \,\mathrm{Log}\left[1+\frac{\mathrm{i}\left(\sqrt{e}-\sqrt{c^2 d+e}\right) e^{\mathrm{i}\,\mathrm{ArcSec}[c\, x]}}{c\sqrt{d}}\right] - \right.$$

$$4\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{\mathrm{i}\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right] \mathrm{Log}\left[1+\frac{\mathrm{i}\left(\sqrt{e}-\sqrt{c^2 d+e}\right) e^{\mathrm{i}\,\mathrm{ArcSec}[c\, x]}}{c\sqrt{d}}\right] - 2\,\mathrm{i}\,\mathrm{ArcSec}[c\, x]\,\mathrm{Log}\left[1+\frac{\mathrm{i}\left(\sqrt{e}+\sqrt{c^2 d+e}\right) e^{\mathrm{i}\,\mathrm{ArcSec}[c\, x]}}{c\sqrt{d}}\right] +$$

$$4\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{\mathrm{i}\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right] \mathrm{Log}\left[1+\frac{\mathrm{i}\left(\sqrt{e}+\sqrt{c^2 d+e}\right) e^{\mathrm{i}\,\mathrm{ArcSec}[c\, x]}}{c\sqrt{d}}\right] + 2\,\mathrm{i}\,\mathrm{ArcSec}[c\, x]\,\mathrm{Log}\left[1+e^{2\,\mathrm{i}\,\mathrm{ArcSec}[c\, x]}\right] -$$

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

$$\frac{1}{4 e^3} \mathrm{i} \left(8 \,\mathrm{ArcSin}\left[\frac{\sqrt{1-\frac{\mathrm{i}\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right] \mathrm{ArcTan}\left[\frac{\left(-\mathrm{i}\, c \sqrt{d}+\sqrt{e}\right) \mathrm{Tan}\left[\frac{1}{2} \mathrm{ArcSec}[c\, x]\right]}{\sqrt{c^2 d+e}}\right] - 2\,\mathrm{i}\, \mathrm{ArcSec}[c\, x] \,\mathrm{Log}\left[1+\frac{\mathrm{i}\left(-\sqrt{e}+\sqrt{c^2 d+e}\right) e^{\mathrm{i}\,\mathrm{ArcSec}[c\, x]}}{c\sqrt{d}}\right] - \right.$$

$$4\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1-\frac{\mathrm{i}\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right] \mathrm{Log}\left[1+\frac{\mathrm{i}\left(-\sqrt{e}+\sqrt{c^2 d+e}\right) e^{\mathrm{i}\,\mathrm{ArcSec}[c\, x]}}{c\sqrt{d}}\right] - 2\,\mathrm{i}\,\mathrm{ArcSec}[c\, x]\,\mathrm{Log}\left[1-\frac{\mathrm{i}\left(\sqrt{e}+\sqrt{c^2 d+e}\right) e^{\mathrm{i}\,\mathrm{ArcSec}[c\, x]}}{c\sqrt{d}}\right] +$$

$$4\,\mathrm{i}\,\mathrm{ArcSin}\left[\frac{\sqrt{1-\frac{\mathrm{i}\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right] \mathrm{Log}\left[1-\frac{\mathrm{i}\left(\sqrt{e}+\sqrt{c^2 d+e}\right) e^{\mathrm{i}\,\mathrm{ArcSec}[c\, x]}}{c\sqrt{d}}\right] + 2\,\mathrm{i}\,\mathrm{ArcSec}[c\, x]\,\mathrm{Log}\left[1+e^{2\,\mathrm{i}\,\mathrm{ArcSec}[c\, x]}\right] -$$

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

Problem 105: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 157 leaves, 6 steps):

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

Result (type 3, 389 leaves):

$$-\frac{1}{16 e^2}\left(-\frac{4 a d}{\left(d+e x^2\right)^2}+\frac{8 a}{d+e x^2}-\frac{2 b c e \sqrt{1-\frac{1}{c^2 x^2}}\, x}{\left(c^2 d+e\right)\left(d+e x^2\right)}+\frac{4 b \left(d+2 e x^2\right) \text{ArcSec}[c x]}{\left(d+e x^2\right)^2}+\frac{4 b \text{ArcSin}\left[\frac{1}{c x}\right]}{d}+\right.$$

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

Problem 106: Result unnecessarily involves imaginary or complex numbers.

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

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

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

Result (type 3, 386 leaves):

$$\frac{1}{16}\left(-\frac{4 a}{e \left(d+e x^2\right)^2}-\frac{2 b c \sqrt{1-\frac{1}{c^2 x^2}}\, x}{d \left(c^2 d+e\right)\left(d+e x^2\right)}-\frac{4 b \text{ArcSec}[c x]}{e \left(d+e x^2\right)^2}-\frac{4 b \text{ArcSin}\left[\frac{1}{c x}\right]}{d^2 e}-\right.$$

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

Problem 107: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 685 leaves, 28 steps):

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

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

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

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

Result (type 4, 1871 leaves):

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

$$b\left(-\frac{5\,i\sqrt{e}\left(-\frac{\text{ArcSec}[c\,x]}{i\sqrt{d}\sqrt{e}+e\,x}+\frac{i\left(\frac{\text{ArcSin}\left[\frac{1}{c\,x}\right]}{\sqrt{e}}-\frac{\text{Log}\left[\frac{2\sqrt{d}\sqrt{e}\left(\sqrt{e}+c\left(i\,c\sqrt{d}-\sqrt{-c^2 d-e}\sqrt{1-\frac{1}{c^2 x^2}}\right)x\right)}{\sqrt{-c^2 d-e}\left(\sqrt{d}-i\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2 d-e}}\right)}{\sqrt{d}}\right)}{16\,d^{5/2}}+\frac{5\,i\sqrt{e}\left(-\frac{\text{ArcSec}[c\,x]}{-i\sqrt{d}\sqrt{e}+e\,x}-\frac{i\left(\frac{\text{ArcSin}\left[\frac{1}{c\,x}\right]}{\sqrt{e}}-\frac{\text{Log}\left[\frac{2\sqrt{d}\sqrt{e}\left(-\sqrt{e}+c\left(i\,c\sqrt{d}+\sqrt{-c^2 d-e}\sqrt{1-\frac{1}{c^2 x^2}}\right)x\right)}{\sqrt{-c^2 d-e}\left(\sqrt{d}+i\sqrt{e}\,x\right)}\right]}{\sqrt{-c^2 d-e}}\right)}{\sqrt{d}}\right)}{16\,d^{5/2}}+\right.$$

$$\frac{1}{16\,d^2}\sqrt{e}\left(-\frac{\text{ArcSec}[c\,x]}{\sqrt{e}\left(-i\sqrt{d}+\sqrt{e}\,x\right)^2}+\frac{\frac{\text{ArcSin}\left[\frac{1}{c\,x}\right]}{\sqrt{e}}-i\left(\frac{c\sqrt{d}\sqrt{e}\sqrt{1-\frac{1}{c^2 x^2}}\,x}{\left(c^2 d+e\right)\left(-i\sqrt{d}+\sqrt{e}\,x\right)}+\frac{\left(2\,c^2 d+e\right)\text{Log}\left[-\frac{4\,d\sqrt{e}\sqrt{c^2 d+e}\left(i\sqrt{e}+c\left(c\sqrt{d}-\sqrt{c^2 d+e}\sqrt{1-\frac{1}{c^2 x^2}}\right)x\right)}{\left(2\,c^2 d+e\right)\left(-i\sqrt{d}+\sqrt{e}\,x\right)}\right]}{\left(c^2 d+e\right)^{3/2}}\right)}{d}\right)+\frac{1}{16\,d^2}$$

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

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

$$\frac{1}{4\,d^3}\,i\left(8\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right]\text{ArcTan}\left[\frac{\left(i\,c\sqrt{d}+\sqrt{e}\right)\text{Tan}\left[\frac{1}{2}\text{ArcSec}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right] - 2\,i\,\text{ArcSec}[c\,x]\,\text{Log}\left[1+\frac{i\left(\sqrt{e}-\sqrt{c^2\,d+e}\right)e^{i\,\text{ArcSec}[c\,x]}}{c\sqrt{d}}\right] -\right.$$

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

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

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

$$\frac{1}{4\,d^3}\,i\left(8\,\text{ArcSin}\left[\frac{\sqrt{1-\frac{i\sqrt{e}}{c\sqrt{d}}}}{\sqrt{2}}\right]\text{ArcTan}\left[\frac{\left(-i\,c\sqrt{d}+\sqrt{e}\right)\text{Tan}\left[\frac{1}{2}\text{ArcSec}[c\,x]\right]}{\sqrt{c^2\,d+e}}\right] - 2\,i\,\text{ArcSec}[c\,x]\,\text{Log}\left[1+\frac{i\left(-\sqrt{e}+\sqrt{c^2\,d+e}\right)e^{i\,\text{ArcSec}[c\,x]}}{c\sqrt{d}}\right] -\right.$$

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

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

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

Problem 111: Result unnecessarily involves higher level functions.

$$\int x^5\sqrt{d+e\,x^2}\,\left(a+b\,\text{ArcSec}[c\,x]\right)dx$$

Optimal (type 3, 403 leaves, 12 steps):

$$\frac{b\left(23\,c^4 d^2+12\,c^2 d\,e-75\,e^2\right)x\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}{1680\,c^5 e^2\sqrt{c^2x^2}}+\frac{b\left(29\,c^2 d-25\,e\right)x\sqrt{-1+c^2x^2}\,\left(d+e\,x^2\right)^{3/2}}{840\,c^3 e^2\sqrt{c^2x^2}}-\frac{b\,x\sqrt{-1+c^2x^2}\,\left(d+e\,x^2\right)^{5/2}}{42\,c\,e^2\sqrt{c^2x^2}}+\frac{d^2\left(d+e\,x^2\right)^{3/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{3\,e^3}-\frac{2\,d\left(d+e\,x^2\right)^{5/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{5\,e^3}+\frac{\left(d+e\,x^2\right)^{7/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{7\,e^3}+\frac{8\,b\,c\,d^{7/2}\,x\,\text{ArcTan}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}\,\sqrt{-1+c^2x^2}}\right]}{105\,e^3\sqrt{c^2x^2}}-\frac{b\left(105\,c^6 d^3-35\,c^4 d^2 e+63\,c^2 d\,e^2+75\,e^3\right)x\,\text{ArcTanh}\left[\frac{\sqrt{e}\,\sqrt{-1+c^2x^2}}{c\sqrt{d+e\,x^2}}\right]}{1680\,c^6 e^{5/2}\sqrt{c^2x^2}}$$

Result (type 6, 706 leaves):

$$-\Bigg(\Bigg(b\, d \sqrt{1-\frac{1}{c^2 x^2}}\, x^3 \Bigg(\left(105 c^6 d^3 - 35 c^4 d^2 e + 63 c^2 d e^2 + 75 e^3\right) \text{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, c^2 x^2, -\frac{e x^2}{d}\right]$$

$$\left(c^2 d\, \text{AppellF1}\left[2, \frac{1}{2}, \frac{3}{2}, 3, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right] - e\, \text{AppellF1}\left[2, \frac{3}{2}, \frac{1}{2}, 3, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]\right) + 4\, \text{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]$$

$$\Bigg(\left(35 c^6 d^2 e^2 x^2 - 63 c^4 d e^3 x^2 - 75 c^2 e^4 x^2 + c^8 d^3 \left(128 d - 105 e x^2\right)\right) \text{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, c^2 x^2, -\frac{e x^2}{d}\right] +$$

$$32 c^8 d^3 x^2 \left(-e\, \text{AppellF1}\left[2, \frac{1}{2}, \frac{3}{2}, 3, c^2 x^2, -\frac{e x^2}{d}\right] + c^2 d\, \text{AppellF1}\left[2, \frac{3}{2}, \frac{1}{2}, 3, c^2 x^2, -\frac{e x^2}{d}\right]\right)\Bigg)\Bigg)\Bigg) \Bigg/$$

$$\Bigg(840 c^5 e^2 \left(-1 + c^2 x^2\right) \sqrt{d + e x^2} \Bigg(-4 c^2 e x^2\, \text{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right] + c^2 d\, \text{AppellF1}\left[2, \frac{1}{2}, \frac{3}{2}, 3, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right] -$$

$$e\, \text{AppellF1}\left[2, \frac{3}{2}, \frac{1}{2}, 3, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]\Bigg)$$

$$\left(4 d\, \text{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, c^2 x^2, -\frac{e x^2}{d}\right] + x^2 \left(-e\, \text{AppellF1}\left[2, \frac{1}{2}, \frac{3}{2}, 3, c^2 x^2, -\frac{e x^2}{d}\right] + c^2 d\, \text{AppellF1}\left[2, \frac{3}{2}, \frac{1}{2}, 3, c^2 x^2, -\frac{e x^2}{d}\right]\right)\right)\Bigg) +$$

$$\frac{1}{1680 c^5 e^3} \sqrt{d + e x^2} \Bigg(16 a c^5 \left(8 d^3 - 4 d^2 e x^2 + 3 d e^2 x^4 + 15 e^3 x^6\right) - b e \sqrt{1 - \frac{1}{c^2 x^2}}\, x \left(75 e^2 + 2 c^2 e \left(19 d + 25 e x^2\right) + c^4 \left(-41 d^2 + 22 d e x^2 + 40 e^2 x^4\right)\right) +$$

$$16 b c^5 \left(8 d^3 - 4 d^2 e x^2 + 3 d e^2 x^4 + 15 e^3 x^6\right) \text{ArcSec}[c x]\Bigg)$$

Problem 112: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 294 leaves, 11 steps):

$$-\frac{b \left(c^2 d + 9 e\right) x \sqrt{-1 + c^2 x^2} \sqrt{d + e x^2}}{120 c^3 e \sqrt{c^2 x^2}} - \frac{b x \sqrt{-1 + c^2 x^2} \left(d + e x^2\right)^{3/2}}{20 c e \sqrt{c^2 x^2}} - \frac{d \left(d + e x^2\right)^{3/2} (a + b\, \text{ArcSec}[c x])}{3 e^2} +$$

$$\frac{\left(d + e x^2\right)^{5/2} (a + b\, \text{ArcSec}[c x])}{5 e^2} - \frac{2 b c d^{5/2} x\, \text{ArcTan}\left[\frac{\sqrt{d + e x^2}}{\sqrt{d} \sqrt{-1 + c^2 x^2}}\right]}{15 e^2 \sqrt{c^2 x^2}} + \frac{b \left(15 c^4 d^2 - 10 c^2 d e - 9 e^2\right) x\, \text{ArcTanh}\left[\frac{\sqrt{e} \sqrt{-1 + c^2 x^2}}{c \sqrt{d + e x^2}}\right]}{120 c^4 e^{3/2} \sqrt{c^2 x^2}}$$

Result (type 6, 628 leaves):

$$\left(b\,d\,\sqrt{1-\frac{1}{c^2 x^2}}\;x^3\left(\left(15\,c^4 d^2-10\,c^2 d\,e-9\,e^2\right)\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e\,x^2}{d}\right]\right.\right.$$
$$\left(c^2 d\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]-e\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]\right)+$$
$$4\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]\left(\left(10\,c^4 d\,e^2 x^2+9\,c^2 e^3 x^2+c^6 d^2\left(16\,d-15\,e\,x^2\right)\right)\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e\,x^2}{d}\right]+\right.$$
$$\left.\left.\left.4\,c^6 d^2 x^2\left(-e\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]+c^2 d\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]\right)\right)\right)\right)\Big/$$
$$\left(60\,c^3 e\left(-1+c^2 x^2\right)\sqrt{d+e\,x^2}\left(-4\,c^2 e\,x^2\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]+c^2 d\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]-\right.\right.$$
$$\left.e\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]\right)$$
$$\left.\left(4\,d\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e\,x^2}{d}\right]+x^2\left(-e\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]+c^2 d\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]\right)\right)\right)+$$
$$\frac{1}{120\,c^3 e^2}\sqrt{d+e\,x^2}\left(8\,a\,c^3\left(-2\,d^2+d\,e\,x^2+3\,e^2 x^4\right)-b\,e\sqrt{1-\frac{1}{c^2 x^2}}\;x\left(9\,e+c^2\left(7\,d+6\,e\,x^2\right)\right)+8\,b\,c^3\left(-2\,d^2+d\,e\,x^2+3\,e^2 x^4\right)\text{ArcSec}[c\,x]\right)$$

Problem 113: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 195 leaves, 9 steps):

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

Result (type 6, 548 leaves):

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

Problem 119: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 328 leaves, 11 steps):

$$\frac{2\,b\,c\left(c^2 d+2e\right)\sqrt{-1+c^2x^2}\,\sqrt{d+e x^2}}{9\,d\sqrt{c^2x^2}}+\frac{b\,c\sqrt{-1+c^2x^2}\,\sqrt{d+e x^2}}{9\,x^2\sqrt{c^2x^2}}-$$
$$\frac{\left(d+e x^2\right)^{3/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{3\,d\,x^3}-\frac{2\,b\,c^2\left(c^2 d+2e\right)x\sqrt{1-c^2x^2}\,\sqrt{d+e x^2}\,\text{EllipticE}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{9\,d\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{1+\frac{e x^2}{d}}}+$$
$$\frac{b\left(c^2 d+e\right)\left(2c^2 d+3e\right)x\sqrt{1-c^2x^2}\,\sqrt{1+\frac{e x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{9\,d\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{d+e x^2}}$$

Result (type 4, 247 leaves):

$$\frac{\sqrt{d+e x^2}\left(-3 a \left(d+e x^2\right)+b c \sqrt{1-\frac{1}{c^2 x^2}}\, x \left(d+2 c^2 d x^2+4 e x^2\right)-3 b \left(d+e x^2\right) \text{ArcSec}[c x]\right)}{9 d x^3}-$$

$$\left(i b c \sqrt{1-\frac{1}{c^2 x^2}}\, x \sqrt{1+\frac{e x^2}{d}} \left(2 c^2 d \left(c^2 d+2 e\right) \text{EllipticE}\left[i \text{ArcSinh}\left[\sqrt{-c^2}\, x\right],-\frac{e}{c^2 d}\right]-\left(2 c^4 d^2+5 c^2 d e+3 e^2\right) \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-c^2}\, x\right],-\frac{e}{c^2 d}\right]\right)\right) \Big/ \left(9 \sqrt{-c^2}\, d \sqrt{1-c^2 x^2} \sqrt{d+e x^2}\right)$$

Problem 120: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 453 leaves, 12 steps):

$$\frac{b c \left(24 c^4 d^2+19 c^2 d e-31 e^2\right) \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}}{225 d^2 \sqrt{c^2 x^2}}+\frac{b c \left(12 c^2 d-e\right) \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}}{225 d x^2 \sqrt{c^2 x^2}}+$$

$$\frac{b c \sqrt{-1+c^2 x^2} \left(d+e x^2\right)^{3/2}}{25 d x^4 \sqrt{c^2 x^2}}-\frac{\left(d+e x^2\right)^{3/2} \left(a+b \text{ArcSec}[c x]\right)}{5 d x^5}+\frac{2 e \left(d+e x^2\right)^{3/2} \left(a+b \text{ArcSec}[c x]\right)}{15 d^2 x^3}-$$

$$\frac{b c^2 \left(24 c^4 d^2+19 c^2 d e-31 e^2\right) x \sqrt{1-c^2 x^2} \sqrt{d+e x^2}\, \text{EllipticE}\left[\text{ArcSin}[c x],-\frac{e}{c^2 d}\right]}{225 d^2 \sqrt{c^2 x^2} \sqrt{-1+c^2 x^2} \sqrt{1+\frac{e x^2}{d}}}+$$

$$\frac{b \left(c^2 d+e\right) \left(24 c^4 d^2+7 c^2 d e-30 e^2\right) x \sqrt{1-c^2 x^2} \sqrt{1+\frac{e x^2}{d}}\, \text{EllipticF}\left[\text{ArcSin}[c x],-\frac{e}{c^2 d}\right]}{225 d^2 \sqrt{c^2 x^2} \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}}$$

Result (type 4, 325 leaves):

$$\frac{1}{225\, d^2\, x^5}\sqrt{d+e\,x^2}\left(-15\,a\left(3\,d^2+d\,e\,x^2-2\,e^2\,x^4\right)+\right.$$

$$\left.b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\left(-31\,e^2\,x^4+d\,e\,x^2\left(8+19\,c^2\,x^2\right)+3\,d^2\left(3+4\,c^2\,x^2+8\,c^4\,x^4\right)\right)-15\,b\left(3\,d^2+d\,e\,x^2-2\,e^2\,x^4\right)\text{ArcSec}[c\,x]\right)-$$

$$\left(\mathrm{i}\,b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\,\sqrt{1+\frac{e\,x^2}{d}}\left(c^2\,d\left(24\,c^4\,d^2+19\,c^2\,d\,e-31\,e^2\right)\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-c^2}\;x\right],-\frac{e}{c^2\,d}\right]+\right.\right.$$

$$\left.\left.\left(-24\,c^6\,d^3-31\,c^4\,d^2\,e+23\,c^2\,d\,e^2+30\,e^3\right)\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-c^2}\;x\right],-\frac{e}{c^2\,d}\right]\right)\right)\Big/\left(225\,\sqrt{-c^2}\;d^2\,\sqrt{1-c^2\,x^2}\;\sqrt{d+e\,x^2}\right)$$

Problem 121: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 374 leaves, 12 steps):

$$\frac{b\left(3\,c^4\,d^2-38\,c^2\,d\,e-25\,e^2\right)x\,\sqrt{-1+c^2\,x^2}\;\sqrt{d+e\,x^2}}{560\,c^5\,e\,\sqrt{c^2\,x^2}}-\frac{b\left(13\,c^2\,d+25\,e\right)x\,\sqrt{-1+c^2\,x^2}\;\left(d+e\,x^2\right)^{3/2}}{840\,c^3\,e\,\sqrt{c^2\,x^2}}-$$

$$\frac{b\,x\,\sqrt{-1+c^2\,x^2}\;\left(d+e\,x^2\right)^{5/2}}{42\,c\,e\,\sqrt{c^2\,x^2}}-\frac{d\left(d+e\,x^2\right)^{5/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{5\,e^2}+\frac{\left(d+e\,x^2\right)^{7/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{7\,e^2}-$$

$$\frac{2\,b\,c\,d^{7/2}\,x\,\text{ArcTan}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}\;\sqrt{-1+c^2\,x^2}}\right]}{35\,e^2\,\sqrt{c^2\,x^2}}+\frac{b\left(35\,c^6\,d^3-35\,c^4\,d^2\,e-63\,c^2\,d\,e^2-25\,e^3\right)x\,\text{ArcTanh}\left[\frac{\sqrt{e}\;\sqrt{-1+c^2\,x^2}}{c\,\sqrt{d+e\,x^2}}\right]}{560\,c^6\,e^{3/2}\,\sqrt{c^2\,x^2}}$$

Result (type 6, 679 leaves):

$$\left(b\,d\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x^3\,\left(\left(35\,c^6\,d^3-35\,c^4\,d^2\,e-63\,c^2\,d\,e^2-25\,e^3\right)\right.\right.$$

$$\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2\,x^2,-\frac{e\,x^2}{d}\right]\left(c^2\,d\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2\,x^2},-\frac{d}{e\,x^2}\right]-e\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2\,x^2},-\frac{d}{e\,x^2}\right]\right)+$$

$$4\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2\,x^2},-\frac{d}{e\,x^2}\right]\left(\left(35\,c^6\,d^2\,e^2\,x^2+63\,c^4\,d\,e^3\,x^2+25\,c^2\,e^4\,x^2+c^8\,d^3\left(32\,d-35\,e\,x^2\right)\right)\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2\,x^2,-\frac{e\,x^2}{d}\right]+\right.$$

$$\left.\left.\left.8\,c^8\,d^3\,x^2\left(-e\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2\,x^2,-\frac{e\,x^2}{d}\right]+c^2\,d\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2\,x^2,-\frac{e\,x^2}{d}\right]\right)\right)\right)\right)\Big/$$

$$\left(280\,c^5\,e\left(-1+c^2\,x^2\right)\sqrt{d+e\,x^2}\left(-4\,c^2\,e\,x^2\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2\,x^2},-\frac{d}{e\,x^2}\right]+c^2\,d\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2\,x^2},-\frac{d}{e\,x^2}\right]-\right.\right.$$

$$\left.e\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2\,x^2},-\frac{d}{e\,x^2}\right]\right)$$

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

$$\frac{1}{1680\,c^5\,e^2}\sqrt{d+e\,x^2}\left(48\,a\,c^5\left(2\,d-5\,e\,x^2\right)\left(d+e\,x^2\right)^2+b\,e\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\left(75\,e^2+2\,c^2\,e\left(82\,d+25\,e\,x^2\right)+c^4\left(57\,d^2+106\,d\,e\,x^2+40\,e^2\,x^4\right)\right)+\right.$$

$$\left.48\,b\,c^5\left(2\,d-5\,e\,x^2\right)\left(d+e\,x^2\right)^2\text{ArcSec}[c\,x]\right)$$

Problem 122: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 262 leaves, 10 steps):

$$-\frac{b\left(7\,c^2\,d+3\,e\right)x\,\sqrt{-1+c^2\,x^2}\;\sqrt{d+e\,x^2}}{40\,c^3\,\sqrt{c^2\,x^2}}-\frac{b\,x\,\sqrt{-1+c^2\,x^2}\left(d+e\,x^2\right)^{3/2}}{20\,c\,\sqrt{c^2\,x^2}}+$$

$$\frac{\left(d+e\,x^2\right)^{5/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{5\,e}+\frac{b\,c\,d^{5/2}\,x\,\text{ArcTan}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}\,\sqrt{-1+c^2\,x^2}}\right]}{5\,e\,\sqrt{c^2\,x^2}}-\frac{b\left(15\,c^4\,d^2+10\,c^2\,d\,e+3\,e^2\right)x\,\text{ArcTanh}\left[\frac{\sqrt{e}\,\sqrt{-1+c^2\,x^2}}{c\,\sqrt{d+e\,x^2}}\right]}{40\,c^4\,\sqrt{e}\,\sqrt{c^2\,x^2}}$$

Result (type 6, 604 leaves) :

$$\begin{aligned}&\left(b\,d\,\sqrt{1-\frac{1}{c^2 x^2}}\;x^3\left(-\left(15\,c^4 d^2+10\,c^2 d\,e+3\,e^2\right)\right.\right.\\
&\quad\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e\,x^2}{d}\right]\left(c^2 d\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]-e\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]\right)+\\
&\quad\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]\left(\left(40\,c^4 d\,e^2 x^2+12\,c^2 e^3 x^2+4\,c^6 d^2\left(-8\,d+15\,e\,x^2\right)\right)\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e\,x^2}{d}\right]+\right.\\
&\quad\left.\left.\left.8\,c^6 d^2 x^2\left(e\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]-c^2 d\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]\right)\right)\right)\right)\Big/\\
&\left(20\,c^3\left(-1+c^2 x^2\right)\sqrt{d+e\,x^2}\left(-4\,c^2 e\,x^2\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]+c^2 d\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]-\right.\right.\\
&\quad\left.e\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]\right)\\
&\quad\left.\left(4\,d\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e\,x^2}{d}\right]+x^2\left(-e\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]+c^2 d\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]\right)\right)\right)+\\
&\frac{\sqrt{d+e\,x^2}\left(8\,a\,c^3\left(d+e\,x^2\right)^2-b\,e\,\sqrt{1-\frac{1}{c^2 x^2}}\;x\left(3\,e+c^2\left(9\,d+2\,e\,x^2\right)\right)+8\,b\,c^3\left(d+e\,x^2\right)^2\text{ArcSec}[c\,x]\right)}{40\,c^3 e}\end{aligned}$$

Problem 129: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(d+e\,x^2\right)^{3/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{x^6}\,dx$$

Optimal (type 4, 416 leaves, 12 steps) :

$$\frac{b\,c\,\left(8\,c^4\,d^2+23\,c^2\,d\,e+23\,e^2\right)\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{75\,d\,\sqrt{c^2\,x^2}}+\frac{4\,b\,c\,\left(c^2\,d+2\,e\right)\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{75\,x^2\,\sqrt{c^2\,x^2}}+\frac{b\,c\,\sqrt{-1+c^2\,x^2}\,\left(d+e\,x^2\right)^{3/2}}{25\,x^4\,\sqrt{c^2\,x^2}}-$$

$$\frac{\left(d+e\,x^2\right)^{5/2}\,\left(a+b\,\text{ArcSec}[c\,x]\right)}{5\,d\,x^5}-\frac{b\,c^2\,\left(8\,c^4\,d^2+23\,c^2\,d\,e+23\,e^2\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\,\text{EllipticE}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{75\,d\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}}+$$

$$\frac{b\,\left(c^2\,d+e\right)\,\left(8\,c^4\,d^2+19\,c^2\,d\,e+15\,e^2\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{75\,d\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 303 leaves):

$$\frac{1}{75\,d\,x^5}\sqrt{d+e\,x^2}\,\left(-15\,a\,\left(d+e\,x^2\right)^2+b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\,x\,\left(23\,e^2\,x^4+d\,e\,x^2\,\left(11+23\,c^2\,x^2\right)+d^2\,\left(3+4\,c^2\,x^2+8\,c^4\,x^4\right)\right)-15\,b\,\left(d+e\,x^2\right)^2\,\text{ArcSec}[c\,x]\right)-$$

$$\left(i\,b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\,x\,\sqrt{1+\frac{e\,x^2}{d}}\,\left(c^2\,d\,\left(8\,c^4\,d^2+23\,c^2\,d\,e+23\,e^2\right)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-c^2}\,x\right],-\frac{e}{c^2\,d}\right]-\right.\right.$$

$$\left.\left.\left(8\,c^6\,d^3+27\,c^4\,d^2\,e+34\,c^2\,d\,e^2+15\,e^3\right)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-c^2}\,x\right],-\frac{e}{c^2\,d}\right]\right)\right)\Big/\left(75\,\sqrt{-c^2}\,d\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\right)$$

Problem 130: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\left(d+e\,x^2\right)^{3/2}\,\left(a+b\,\text{ArcSec}[c\,x]\right)}{x^8}\,dx$$

Optimal (type 4, 554 leaves, 13 steps):

$$\frac{b\,c\,\left(240\,c^6\,d^3+528\,c^4\,d^2\,e+193\,c^2\,d\,e^2-247\,e^3\right)\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{3675\,d^2\,\sqrt{c^2\,x^2}}+\frac{b\,c\,\left(120\,c^4\,d^2+159\,c^2\,d\,e-37\,e^2\right)\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{3675\,d\,x^2\,\sqrt{c^2\,x^2}}+$$
$$\frac{b\,c\,\left(30\,c^2\,d+11\,e\right)\sqrt{-1+c^2\,x^2}\,\left(d+e\,x^2\right)^{3/2}}{1225\,d\,x^4\,\sqrt{c^2\,x^2}}+\frac{b\,c\,\sqrt{-1+c^2\,x^2}\,\left(d+e\,x^2\right)^{5/2}}{49\,d\,x^6\,\sqrt{c^2\,x^2}}-\frac{\left(d+e\,x^2\right)^{5/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{7\,d\,x^7}+$$
$$\frac{2\,e\,\left(d+e\,x^2\right)^{5/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{35\,d^2\,x^5}-\frac{b\,c^2\,\left(240\,c^6\,d^3+528\,c^4\,d^2\,e+193\,c^2\,d\,e^2-247\,e^3\right)x\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\;\text{EllipticE}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{3675\,d^2\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}}+$$
$$\left(2\,b\,\left(c^2\,d+e\right)\left(120\,c^6\,d^3+204\,c^4\,d^2\,e+17\,c^2\,d\,e^2-105\,e^3\right)x\,\sqrt{1-c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\;\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]\right)\Big/$$
$$\left(3675\,d^2\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}\right)$$

Result (type 4, 383 leaves):

$$\frac{1}{3675\,d^2\,x^7}\sqrt{d+e\,x^2}\,\Bigg(-105\,a\,\left(5\,d-2\,e\,x^2\right)\left(d+e\,x^2\right)^2+$$
$$b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\,\left(-247\,e^3\,x^6+d\,e^2\,x^4\left(71+193\,c^2\,x^2\right)+3\,d^2\,e\,x^2\left(61+83\,c^2\,x^2+176\,c^4\,x^4\right)+15\,d^3\left(5+6\,c^2\,x^2+8\,c^4\,x^4+16\,c^6\,x^6\right)\right)-$$
$$105\,b\,\left(5\,d-2\,e\,x^2\right)\left(d+e\,x^2\right)^2\,\text{ArcSec}[c\,x]\Bigg)-$$
$$\left(i\,b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\,\sqrt{1+\frac{e\,x^2}{d}}\,\left(c^2\,d\,\left(240\,c^6\,d^3+528\,c^4\,d^2\,e+193\,c^2\,d\,e^2-247\,e^3\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-c^2}\;x\right],-\frac{e}{c^2\,d}\right]-\right.\right.$$
$$\left.\left.2\,\left(120\,c^8\,d^4+324\,c^6\,d^3\,e+221\,c^4\,d^2\,e^2-88\,c^2\,d\,e^3-105\,e^4\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-c^2}\;x\right],-\frac{e}{c^2\,d}\right]\right)\right)\Big/\left(3675\,\sqrt{-c^2}\;d^2\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\right)$$

Problem 131: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 321 leaves, 11 steps):

$$\frac{b\left(19 c^2 d-9 e\right) x \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}}{120 c^3 e^2 \sqrt{c^2 x^2}}-\frac{b x \sqrt{-1+c^2 x^2}\left(d+e x^2\right)^{3/2}}{20 c e^2 \sqrt{c^2 x^2}}+\frac{d^2 \sqrt{d+e x^2}\,(a+b \operatorname{ArcSec}[c x])}{e^3}-\frac{2 d\left(d+e x^2\right)^{3/2}(a+b \operatorname{ArcSec}[c x])}{3 e^3}+$$
$$\frac{\left(d+e x^2\right)^{5/2}(a+b \operatorname{ArcSec}[c x])}{5 e^3}+\frac{8 b c d^{5/2} x \operatorname{ArcTan}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d} \sqrt{-1+c^2 x^2}}\right]}{15 e^3 \sqrt{c^2 x^2}}-\frac{b\left(45 c^4 d^2-10 c^2 d e+9 e^2\right) x \operatorname{ArcTanh}\left[\frac{\sqrt{e} \sqrt{-1+c^2 x^2}}{c \sqrt{d+e x^2}}\right]}{120 c^4 e^{5/2} \sqrt{c^2 x^2}}$$

Result (type 6, 629 leaves):

$$-\left(\left(b d \sqrt{1-\frac{1}{c^2 x^2}}\, x^3 \left(\left(45 c^4 d^2-10 c^2 d e+9 e^2\right) \operatorname{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, c^2 x^2, -\frac{e x^2}{d}\right]\right.\right.\right.$$
$$\left(c^2 d \operatorname{AppellF1}\left[2, \frac{1}{2}, \frac{3}{2}, 3, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]-e \operatorname{AppellF1}\left[2, \frac{3}{2}, \frac{1}{2}, 3, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]\right)+$$
$$4 \operatorname{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]\left(\left(10 c^4 d e^2 x^2-9 c^2 e^3 x^2+c^6 d^2\left(64 d-45 e x^2\right)\right) \operatorname{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, c^2 x^2, -\frac{e x^2}{d}\right]+\right.$$
$$\left.\left.\left.16 c^6 d^2 x^2\left(-e \operatorname{AppellF1}\left[2, \frac{1}{2}, \frac{3}{2}, 3, c^2 x^2, -\frac{e x^2}{d}\right]+c^2 d \operatorname{AppellF1}\left[2, \frac{3}{2}, \frac{1}{2}, 3, c^2 x^2, -\frac{e x^2}{d}\right]\right)\right)\right)\right) \Big/ \left(60 c^3 e^2\left(-1+c^2 x^2\right) \sqrt{d+e x^2}\right.$$
$$\left(-4 c^2 e x^2 \operatorname{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]+c^2 d \operatorname{AppellF1}\left[2, \frac{1}{2}, \frac{3}{2}, 3, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]-e \operatorname{AppellF1}\left[2, \frac{3}{2}, \frac{1}{2}, 3, \frac{1}{c^2 x^2}, -\frac{d}{e x^2}\right]\right)$$
$$\left.\left(4 d \operatorname{AppellF1}\left[1, \frac{1}{2}, \frac{1}{2}, 2, c^2 x^2, -\frac{e x^2}{d}\right]+x^2\left(-e \operatorname{AppellF1}\left[2, \frac{1}{2}, \frac{3}{2}, 3, c^2 x^2, -\frac{e x^2}{d}\right]+c^2 d \operatorname{AppellF1}\left[2, \frac{3}{2}, \frac{1}{2}, 3, c^2 x^2, -\frac{e x^2}{d}\right]\right)\right)\right)+$$
$$\frac{1}{120 c^3 e^3} \sqrt{d+e x^2}\left(8 a c^3\left(8 d^2-4 d e x^2+3 e^2 x^4\right)+b e \sqrt{1-\frac{1}{c^2 x^2}}\, x\left(-9 e+c^2\left(13 d-6 e x^2\right)\right)+\right.$$
$$\left.8 b c^3\left(8 d^2-4 d e x^2+3 e^2 x^4\right) \operatorname{ArcSec}[c x]\right)$$

Problem 132: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 225 leaves, 10 steps):

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

Result (type 6, 555 leaves):

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

Problem 133: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 132 leaves, 9 steps):

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

Result (type 6, 271 leaves):

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

Problem 139: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{a+b\,\text{ArcSec}[c\,x]}{x^4\,\sqrt{d+e x^2}}\,dx$$

Optimal (type 4, 362 leaves, 11 steps):

$$\frac{b\,c\,(2\,c^2 d-5\,e)\,\sqrt{-1+c^2 x^2}\ \sqrt{d+e x^2}}{9\,d^2\,\sqrt{c^2 x^2}}+\frac{b\,c\,\sqrt{-1+c^2 x^2}\ \sqrt{d+e x^2}}{9\,d\,x^2\,\sqrt{c^2 x^2}}-\frac{\sqrt{d+e x^2}\ (a+b\,\text{ArcSec}[c\,x])}{3\,d\,x^3}+$$
$$\frac{2\,e\,\sqrt{d+e x^2}\ (a+b\,\text{ArcSec}[c\,x])}{3\,d^2\,x}-\frac{b\,c^2\,(2\,c^2 d-5\,e)\,x\,\sqrt{1-c^2 x^2}\ \sqrt{d+e x^2}\ \text{EllipticE}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{9\,d^2\,\sqrt{c^2 x^2}\ \sqrt{-1+c^2 x^2}\ \sqrt{1+\frac{e x^2}{d}}}+$$
$$\frac{2\,b\,(c^2 d-3\,e)\,(c^2 d+e)\,x\,\sqrt{1-c^2 x^2}\ \sqrt{1+\frac{e x^2}{d}}\ \text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{9\,d^2\,\sqrt{c^2 x^2}\ \sqrt{-1+c^2 x^2}\ \sqrt{d+e x^2}}$$

Result (type 4, 249 leaves):

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

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

$$\left.\left.2\,\left(-c^4\,d^2+2\,c^2\,d\,e+3\,e^2\right)\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-c^2}\,x\right],-\frac{e}{c^2\,d}\right]\right)\right)\Big/\left(9\,\sqrt{-c^2}\,d^2\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\right)$$

Problem 140: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{a+b\,\text{ArcSec}[c\,x]}{x^6\,\sqrt{d+e\,x^2}}\,dx$$

Optimal (type 4, 1006 leaves, 32 steps):

$$\frac{8\,b\,c\,e^2\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{15\,d^3\,\sqrt{c^2\,x^2}}-\frac{4\,b\,c\,e\,\left(2\,c^2\,d+e\right)\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{45\,d^3\,\sqrt{c^2\,x^2}}+\frac{b\,c\,\left(8\,c^4\,d^2+3\,c^2\,d\,e-2\,e^2\right)\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{75\,d^3\,\sqrt{c^2\,x^2}}+$$

$$\frac{b\,c\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{25\,d\,x^4\,\sqrt{c^2\,x^2}}-\frac{4\,b\,c\,e\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{45\,d^2\,x^2\,\sqrt{c^2\,x^2}}+\frac{b\,c\,\left(4\,c^2\,d+e\right)\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{75\,d^2\,x^2\,\sqrt{c^2\,x^2}}-$$

$$\frac{\sqrt{d+e\,x^2}\,\left(a+b\,\text{ArcSec}[c\,x]\right)}{5\,d\,x^5}+\frac{4\,e\,\sqrt{d+e\,x^2}\,\left(a+b\,\text{ArcSec}[c\,x]\right)}{15\,d^2\,x^3}-\frac{8\,e^2\,\sqrt{d+e\,x^2}\,\left(a+b\,\text{ArcSec}[c\,x]\right)}{15\,d^3\,x}-$$

$$\frac{8\,b\,c^2\,e^2\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\,\text{EllipticE}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{15\,d^3\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}}+\frac{4\,b\,c^2\,e\,\left(2\,c^2\,d+e\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\,\text{EllipticE}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{45\,d^3\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}}-$$

$$\frac{b\,c^2\,\left(8\,c^4\,d^2+3\,c^2\,d\,e-2\,e^2\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\,\text{EllipticE}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{75\,d^3\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}}+$$

$$\frac{b\,c^2\,\left(8\,c^2\,d-e\right)\,\left(c^2\,d+e\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{75\,d^2\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}-$$

$$\frac{8\,b\,c^2\,e\,\left(c^2\,d+e\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{45\,d^2\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}+\frac{8\,b\,e^2\,\left(c^2\,d+e\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{15\,d^3\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 329 leaves) :

$$\frac{1}{225\,d^3\,x^5}\sqrt{d+e\,x^2}\,\Bigg(-15\,a\,\left(3\,d^2-4\,d\,e\,x^2+8\,e^2\,x^4\right)+$$

$$b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\,\left(94\,e^2\,x^4-d\,e\,x^2\,\left(17+31\,c^2\,x^2\right)+3\,d^2\,\left(3+4\,c^2\,x^2+8\,c^4\,x^4\right)\right)-15\,b\,\left(3\,d^2-4\,d\,e\,x^2+8\,e^2\,x^4\right)\,\text{ArcSec}[c\,x]\Bigg)-$$

$$\Bigg(\mathrm{i}\,b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\;x\,\sqrt{1+\frac{e\,x^2}{d}}\,\Bigg(c^2\,d\,\left(24\,c^4\,d^2-31\,c^2\,d\,e+94\,e^2\right)\,\text{EllipticE}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{-c^2}\;x\Big],-\frac{e}{c^2\,d}\Big]-$$

$$\left(24\,c^6\,d^3-19\,c^4\,d^2\,e+77\,c^2\,d\,e^2+120\,e^3\right)\,\text{EllipticF}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{-c^2}\;x\Big],-\frac{e}{c^2\,d}\Big]\Bigg)\Bigg)\Big/\left(225\,\sqrt{-c^2}\;d^3\,\sqrt{1-c^2\,x^2}\;\sqrt{d+e\,x^2}\right)$$

Problem 141: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 252 leaves, 10 steps):

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

$$\frac{\left(d+e\,x^2\right)^{3/2}\,\left(a+b\,\text{ArcSec}[c\,x]\right)}{3\,e^3}-\frac{8\,b\,c\,d^{3/2}\,x\,\text{ArcTan}\Big[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}\;\sqrt{-1+c^2\,x^2}}\Big]}{3\,e^3\,\sqrt{c^2\,x^2}}+\frac{b\,\left(9\,c^2\,d-e\right)\,x\,\text{ArcTanh}\Big[\frac{\sqrt{e}\;\sqrt{-1+c^2\,x^2}}{c\,\sqrt{d+e\,x^2}}\Big]}{6\,c^2\,e^{5/2}\,\sqrt{c^2\,x^2}}$$

Result (type 6, 587 leaves):

$$\Bigg(b\, d\, \sqrt{1-\frac{1}{c^2 x^2}}\; x^3$$

$$\Bigg(\left(9 c^2 d-e\right) \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right] \left(c^2 d\, \text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]-e\, \text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]\right)+$$

$$4\, \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right] \Bigg(\left(c^2 e^2 x^2+c^4 d \left(16 d-9 e x^2\right)\right) \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right]+$$

$$4 c^4 d x^2 \left(-e\, \text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]+c^2 d\, \text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]\right)\Bigg)\Bigg)\Bigg) \Bigg/ \Bigg(3 c e^2 \left(-1+c^2 x^2\right) \sqrt{d+e x^2}$$

$$\left(-4 c^2 e x^2\, \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]+c^2 d\, \text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]-e\, \text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]\right)$$

$$\left(4 d\, \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right]+x^2 \left(-e\, \text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]+c^2 d\, \text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]\right)\right)\Bigg)+$$

$$\frac{-b e \sqrt{1-\frac{1}{c^2 x^2}}\; x \left(d+e x^2\right)-2 a c \left(8 d^2+4 d e x^2-e^2 x^4\right)-2 b c \left(8 d^2+4 d e x^2-e^2 x^4\right) \text{ArcSec}[c x]}{6 c e^3 \sqrt{d+e x^2}}$$

Problem 142: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 157 leaves, 9 steps):

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

Result (type 6, 326 leaves):

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

Problem 143: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 80 leaves, 4 steps):

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

Result (type 6, 190 leaves):

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

Problem 149: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 274 leaves, 10 steps):

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

$$\frac{b\,c^2\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\,\mathrm{EllipticE}\left[\mathrm{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{d^2\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}}+\frac{b\,\left(c^2\,d+2\,e\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\mathrm{EllipticF}\left[\mathrm{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{d^2\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 212 leaves) :

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

$$\left(\mathrm{i}\,b\,c\,\sqrt{1-\frac{1}{c^2\,x^2}}\,x\,\sqrt{1+\frac{e\,x^2}{d}}\,\left(c^2\,d\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-c^2}\,x\right],-\frac{e}{c^2\,d}\right]-\left(c^2\,d+2\,e\right)\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-c^2}\,x\right],-\frac{e}{c^2\,d}\right]\right)\right)\Big/$$

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

Problem 150: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 701 leaves, 25 steps) :

$$\frac{2\,b\,c\,(c^2 d-e)\,\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}{9\,d^3\,\sqrt{c^2x^2}}-\frac{4\,b\,c\,e\,\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}{3\,d^3\,\sqrt{c^2x^2}}+\frac{b\,c\,\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}{9\,d^2\,x^2\,\sqrt{c^2x^2}}-\frac{a+b\,\mathrm{ArcSec}[c\,x]}{3\,d\,x^3\,\sqrt{d+e\,x^2}}+$$

$$\frac{4\,e\,(a+b\,\mathrm{ArcSec}[c\,x])}{3\,d^2\,x\,\sqrt{d+e\,x^2}}+\frac{8\,e^2\,x\,(a+b\,\mathrm{ArcSec}[c\,x])}{3\,d^3\,\sqrt{d+e\,x^2}}-\frac{2\,b\,c^2\,(c^2 d-e)\,x\,\sqrt{1-c^2x^2}\,\sqrt{d+e\,x^2}\,\mathrm{EllipticE}\left[\mathrm{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{9\,d^3\,\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{1+\frac{e\,x^2}{d}}}+$$

$$\frac{4\,b\,c^2\,e\,x\,\sqrt{1-c^2x^2}\,\sqrt{d+e\,x^2}\,\mathrm{EllipticE}\left[\mathrm{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{3\,d^3\,\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{1+\frac{e\,x^2}{d}}}+\frac{b\,c^2\,(2\,c^2 d-e)\,x\,\sqrt{1-c^2x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\mathrm{EllipticF}\left[\mathrm{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{9\,d^2\,\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}-$$

$$\frac{4\,b\,c^2\,e\,x\,\sqrt{1-c^2x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\mathrm{EllipticF}\left[\mathrm{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{3\,d^2\,\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}-\frac{8\,b\,e^2\,x\,\sqrt{1-c^2x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\mathrm{EllipticF}\left[\mathrm{ArcSin}[c\,x],-\frac{e}{c^2 d}\right]}{3\,d^3\,\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 292 leaves):

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

$$\left(-3\,a\,(d^2-4\,d\,e\,x^2-8\,e^2x^4)+b\,c\,\sqrt{1-\frac{1}{c^2x^2}}\,x\,\left(-14\,e^2x^4+d\,e\,x^2\,(-13+2\,c^2x^2)+d^2\,(1+2\,c^2x^2)\right)-3\,b\,(d^2-4\,d\,e\,x^2-8\,e^2x^4)\,\mathrm{ArcSec}[c\,x]\right)-$$

$$\left(i\,b\,c\,\sqrt{1-\frac{1}{c^2x^2}}\,x\,\sqrt{1+\frac{e\,x^2}{d}}\,\left(2\,c^2 d\,(c^2 d-7\,e)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-c^2}\,x\right],-\frac{e}{c^2 d}\right]+\right.\right.$$

$$\left.\left.(-2\,c^4d^2+13\,c^2 d\,e+24\,e^2)\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-c^2}\,x\right],-\frac{e}{c^2 d}\right]\right)\right)\Big/\left(9\,\sqrt{-c^2}\,d^3\,\sqrt{1-c^2x^2}\,\sqrt{d+e\,x^2}\right)$$

Problem 151: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 244 leaves, 10 steps):

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

$$\frac{\sqrt{d+e\,x^2}\,(a+b\,\mathrm{ArcSec}[c\,x])}{e^3}+\frac{8\,b\,c\,\sqrt{d}\,x\,\mathrm{ArcTan}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}\,\sqrt{-1+c^2 x^2}}\right]}{3\,e^3\,\sqrt{c^2 x^2}}-\frac{b\,x\,\mathrm{ArcTanh}\left[\frac{\sqrt{e}\,\sqrt{-1+c^2 x^2}}{c\,\sqrt{d+e\,x^2}}\right]}{e^{5/2}\,\sqrt{c^2 x^2}}$$

Result (type 6, 417 leaves):

$$\left(2\,b\,c\,d\,\sqrt{1-\frac{1}{c^2 x^2}}\,x^3\left(\left(8\,c^2\,\mathrm{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]\right)\Big/\left(4\,c^2\,e\,x^2\,\mathrm{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]-c^2\,d\,\mathrm{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]+\right.\right.\right.$$

$$\left.e\,\mathrm{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e\,x^2}\right]\right)-\left(3\,\mathrm{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e\,x^2}{d}\right]\right)\Big/$$

$$\left.\left.\left(4\,d\,\mathrm{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e\,x^2}{d}\right]+x^2\left(-e\,\mathrm{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]+c^2\,d\,\mathrm{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e\,x^2}{d}\right]\right)\right)\right)\right)\Big/$$

$$\left(3\,e^2\,(-1+c^2 x^2)\,\sqrt{d+e\,x^2}\right)+\left(-b\,c\,d\,e\,\sqrt{1-\frac{1}{c^2 x^2}}\,x\,(d+e\,x^2)+a\,(c^2 d+e)\,(8\,d^2+12\,d\,e\,x^2+3\,e^2 x^4)+\right.$$

$$\left.b\,(c^2 d+e)\,(8\,d^2+12\,d\,e\,x^2+3\,e^2 x^4)\,\mathrm{ArcSec}[c\,x]\right)\Big/\left(3\,e^3\,(c^2 d+e)\,(d+e\,x^2)^{3/2}\right)$$

Problem 152: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 163 leaves, 7 steps):

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

Result (type 6, 269 leaves):

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

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

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

Problem 153: Result unnecessarily involves higher level functions.

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

Optimal (type 3, 138 leaves, 5 steps):

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

Result (type 6, 255 leaves):

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

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

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

Problem 159: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 296 leaves, 10 steps):

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

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

Result (type 4, 248 leaves):

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

$$\left(\mathbb{i} b c \sqrt{1-\frac{1}{c^2 x^2}} x \sqrt{1+\frac{e x^2}{d}} \left(c^2 d \text{EllipticE}\left[\mathbb{i} \text{ArcSinh}\left[\sqrt{-c^2} x\right],-\frac{e}{c^2 d}\right]+2 \left(c^2 d+e\right) \text{EllipticF}\left[\mathbb{i} \text{ArcSinh}\left[\sqrt{-c^2} x\right],-\frac{e}{c^2 d}\right]\right)\right)\Big/$$

$$\left(3 \sqrt{-c^2} d^2 \left(c^2 d+e\right) \sqrt{1-c^2 x^2} \sqrt{d+e x^2}\right)$$

Problem 160: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 631 leaves, 26 steps):

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

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

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

$$\frac{b\,c^2x\sqrt{1-c^2x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2d}\right]}{d^2\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}+\frac{8\,b\,e\,x\sqrt{1-c^2x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2d}\right]}{3\,d^3\sqrt{c^2x^2}\,\sqrt{-1+c^2x^2}\,\sqrt{d+e\,x^2}}$$

Result (type 4, 323 leaves):

$$\Bigg(-a\left(c^2d+e\right)\left(3\,d^2+12\,d\,e\,x^2+8\,e^2x^4\right)+b\,c\sqrt{1-\frac{1}{c^2x^2}}\;x\left(d+e\,x^2\right)\left(3\,c^2d\left(d+e\,x^2\right)+e\left(3\,d+2\,e\,x^2\right)\right)-$$
$$b\left(c^2d+e\right)\left(3\,d^2+12\,d\,e\,x^2+8\,e^2x^4\right)\text{ArcSec}[c\,x]\Bigg)\Big/\left(3\,d^3\left(c^2d+e\right)x\left(d+e\,x^2\right)^{3/2}\right)-$$
$$\Bigg(i\,b\,c\sqrt{1-\frac{1}{c^2x^2}}\;x\sqrt{1+\frac{e\,x^2}{d}}\,\Bigg(c^2d\left(3\,c^2d+2\,e\right)\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-c^2}\;x\right],-\frac{e}{c^2d}\right]-$$
$$\left(3\,c^4d^2+11\,c^2d\,e+8\,e^2\right)\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-c^2}\;x\right],-\frac{e}{c^2d}\right]\Bigg)\Bigg)\Big/\left(3\sqrt{-c^2}\;d^3\left(c^2d+e\right)\sqrt{1-c^2x^2}\,\sqrt{d+e\,x^2}\right)$$

Test results for the 50 problems in "5.5.2 Inverse secant functions.m"

Problem 14: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{ArcSec}\left[\frac{a}{x}\right]}{x^2}\,dx$$

Optimal (type 3, 31 leaves, 5 steps):

$$-\frac{\text{ArcCos}\left[\frac{x}{a}\right]}{x}+\frac{\text{ArcTanh}\left[\sqrt{1-\frac{x^2}{a^2}}\right]}{a}$$

Result (type 3, 93 leaves):

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

Problem 17: Result unnecessarily involves higher level functions.

$$\int\frac{\text{ArcSec}\left[a\,x^n\right]}{x}\,dx$$

Optimal (type 4, 69 leaves, 7 steps):

$$\frac{i\,\text{ArcSec}\left[a\,x^n\right]^2}{2\,n}-\frac{\text{ArcSec}\left[a\,x^n\right]\,\text{Log}\left[1+e^{2\,i\,\text{ArcSec}\left[a\,x^n\right]}\right]}{n}+\frac{i\,\text{PolyLog}\left[2,\,-e^{2\,i\,\text{ArcSec}\left[a\,x^n\right]}\right]}{2\,n}$$

Result (type 5, 60 leaves):

$$\frac{x^{-n}\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},\frac{1}{2}\right\},\left\{\frac{3}{2},\frac{3}{2}\right\},\frac{x^{-2\,n}}{a^2}\right]}{a\,n}+\left(\text{ArcSec}\left[a\,x^n\right]+\text{ArcSin}\left[\frac{x^{-n}}{a}\right]\right)\,\text{Log}[x]$$

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

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

Optimal (type 3, 37 leaves, 5 steps):

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

Result (type 3, 121 leaves):

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

Problem 24: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 70 leaves, 5 steps):

$$-\frac{b \,\text{ArcSec}[a+b x]}{a}-\frac{\text{ArcSec}[a+b x]}{x}+\frac{2 b \,\text{ArcTan}\left[\frac{\sqrt{1+a} \,\text{Tan}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]}{\sqrt{1-a}}\right]}{a \sqrt{1-a^2}}$$

Result (type 3, 112 leaves):

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

Problem 25: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcSec}[a+b x]}{x^3} \, dx$$

Optimal (type 3, 125 leaves, 7 steps):

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

Result (type 3, 198 leaves):

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

Problem 26: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcSec}[a+b x]}{x^4} \, dx$$

Optimal (type 3, 181 leaves, 8 steps):

$$\frac{b\,(a+b\,x)\,\sqrt{1-\frac{1}{(a+b\,x)^2}}}{6\,a\,\left(1-a^2\right)\,x^2}-\frac{\left(2-5\,a^2\right)\,b^2\,(a+b\,x)\,\sqrt{1-\frac{1}{(a+b\,x)^2}}}{6\,a^2\,\left(1-a^2\right)^2\,x}-\frac{b^3\,\mathrm{ArcSec}[a+b\,x]}{3\,a^3}-\frac{\mathrm{ArcSec}[a+b\,x]}{3\,x^3}+\frac{\left(2-5\,a^2+6\,a^4\right)\,b^3\,\mathrm{ArcTan}\left[\frac{\sqrt{1+a}\,\mathrm{Tan}\left[\frac{1}{2}\,\mathrm{ArcSec}[a+b\,x]\right]}{\sqrt{1-a}}\right]}{3\,a^3\,\left(1-a^2\right)^{5/2}}$$

Result (type 3, 241 leaves):

$$\frac{1}{6}\left(-\frac{b\,\sqrt{\frac{-1+a^2+2\,a\,b\,x+b^2\,x^2}{(a+b\,x)^2}}\,\left(a^4+a\,b\,x-4\,a^3\,b\,x+2\,b^2\,x^2-a^2\,\left(1+5\,b^2\,x^2\right)\right)}{a^2\,\left(-1+a^2\right)^2\,x^2}-\frac{2\,\mathrm{ArcSec}[a+b\,x]}{x^3}+\frac{2\,b^3\,\mathrm{ArcSin}\left[\frac{1}{a+b\,x}\right]}{a^3}-\frac{i\,\left(2-5\,a^2+6\,a^4\right)\,b^3\,\mathrm{Log}\left[\frac{12\,a^3\,\left(-1+a^2\right)^2\,\left(\frac{i\,\left(-1+a^2+a\,b\,x\right)}{\sqrt{1-a^2}}+(a+b\,x)\,\sqrt{\frac{-1+a^2+2\,a\,b\,x+b^2\,x^2}{(a+b\,x)^2}}\right)}{\left(2-5\,a^2+6\,a^4\right)\,b^3\,x}\right]}{a^3\,\left(1-a^2\right)^{5/2}}\right)$$

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

$$\int x^3\,\mathrm{ArcSec}[a+b\,x]^2\,dx$$

Optimal (type 4, 381 leaves, 20 steps):

$$-\frac{a x}{b^3}+\frac{(a+b x)^2}{12 b^4}-\frac{(a+b x) \sqrt{1-\frac{1}{(a+b x)^2}}\, \text{ArcSec}[a+b x]}{3 b^4}-\frac{3 a^2 (a+b x) \sqrt{1-\frac{1}{(a+b x)^2}}\, \text{ArcSec}[a+b x]}{b^4}+$$

$$\frac{a (a+b x)^2 \sqrt{1-\frac{1}{(a+b x)^2}}\, \text{ArcSec}[a+b x]}{b^4}-\frac{(a+b x)^3 \sqrt{1-\frac{1}{(a+b x)^2}}\, \text{ArcSec}[a+b x]}{6 b^4}-\frac{a^4 \text{ArcSec}[a+b x]^2}{4 b^4}+\frac{1}{4} x^4 \text{ArcSec}[a+b x]^2-$$

$$\frac{2 i a \text{ArcSec}[a+b x] \text{ArcTan}\left[e^{i \text{ArcSec}[a+b x]}\right]}{b^4}-\frac{4 i a^3 \text{ArcSec}[a+b x] \text{ArcTan}\left[e^{i \text{ArcSec}[a+b x]}\right]}{b^4}+\frac{\text{Log}[a+b x]}{3 b^4}+\frac{3 a^2 \text{Log}[a+b x]}{b^4}+$$

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

Result (type 4, 1141 leaves):

$$\frac{1}{b^4}\left(\frac{a b^3 x^3 \left(2+\text{ArcSec}[a+b x]^2+2 a^2 \text{ArcSec}[a+b x]^2\right)}{2 (a+b x)^3 \left(-1+\frac{a}{a+b x}\right)^3}-\frac{\left(-\frac{1}{3}-3 a^2\right) b^3 x^3 \text{Log}\left[\frac{1}{a+b x}\right]}{(a+b x)^3 \left(-1+\frac{a}{a+b x}\right)^3}+\right.$$

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

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

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

$$\left(b^3 x^3 \left(-2+2 \text{ArcSec}[a+b x]-24 a \text{ArcSec}[a+b x]-3 \text{ArcSec}[a+b x]^2+12 a \text{ArcSec}[a+b x]^2-36 a^2 \text{ArcSec}[a+b x]^2\right)\right)\Big/$$

$$\left(48 (a+b x)^3 \left(-1+\frac{a}{a+b x}\right)^3 \left(\text{Cos}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]\right)^2\right)-$$

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

$$\left(b^3 x^3 \left(-2-2 \text{ArcSec}[a+b x]+24 a \text{ArcSec}[a+b x]-3 \text{ArcSec}[a+b x]^2+12 a \text{ArcSec}[a+b x]^2-36 a^2 \text{ArcSec}[a+b x]^2\right)\right)\Big/$$

$$\left(48 (a+b x)^3 \left(-1+\frac{a}{a+b x}\right)^3 \left(\text{Cos}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]\right)^2\right)+$$

$$\frac{b^3 x^3 \left(\text{ArcSec}[a+b x] \text{Sin}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]-6 a \text{ArcSec}[a+b x]^2 \text{Sin}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]\right)}{12 (a+b x)^3 \left(-1+\frac{a}{a+b x}\right)^3 \left(\text{Cos}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcSec}[a+b x]\right]\right)^3}+$$

$$\frac{b^3 x^3 \left(\text{ArcSec}[a+b x] \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]+6 a \,\text{ArcSec}[a+b x]^2 \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]\right)}{12 (a+b x)^3 \left(-1+\frac{a}{a+b x}\right)^3 \left(\text{Cos}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]\right)^3}+$$

$$\left(b^3 x^3 \left(-6 a \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]+2 \,\text{ArcSec}[a+b x] \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]+18 a^2 \,\text{ArcSec}[a+b x] \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]-\right.\right.$$
$$\left.\left.3 a \,\text{ArcSec}[a+b x]^2 \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]-6 a^3 \,\text{ArcSec}[a+b x]^2 \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]\right)\right)\Big/$$
$$\left(6 (a+b x)^3 \left(-1+\frac{a}{a+b x}\right)^3 \left(\text{Cos}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]\right)\right)+$$
$$\left(b^3 x^3 \left(6 a \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]+2 \,\text{ArcSec}[a+b x] \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]+18 a^2 \,\text{ArcSec}[a+b x] \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]+\right.\right.$$
$$\left.\left.3 a \,\text{ArcSec}[a+b x]^2 \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]+6 a^3 \,\text{ArcSec}[a+b x]^2 \,\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]\right)\right)\Big/$$
$$\left(6 (a+b x)^3 \left(-1+\frac{a}{a+b x}\right)^3 \left(\text{Cos}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcSec}[a+b x]\right]\right)\right)$$

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

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

Optimal (type 4, 310 leaves, 17 steps):

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

Result (type 4, 813 leaves):

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

$$4 \text{ArcSec}[a+b x] \text{ArcSin}\left[\frac{\sqrt{\frac{-1+a}{a}}}{\sqrt{2}}\right] \text{Log}\left[1+\frac{\left(-1+\sqrt{1-a^2}\right) e^{i \text{ArcSec}[a+b x]}}{a}\right]+$$

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

$$4 \text{ArcSec}[a+b x] \text{ArcSin}\left[\frac{\sqrt{\frac{-1+a}{a}}}{\sqrt{2}}\right] \text{Log}\left[1-\frac{\left(1+\sqrt{1-a^2}\right) e^{i \text{ArcSec}[a+b x]}}{a}\right]-2 \text{ArcSec}[a+b x]^2 \text{Log}\left[1+e^{2 i \text{ArcSec}[a+b x]}\right]+$$

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

$$4 \text{ArcSec}[a+b x] \text{ArcSin}\left[\frac{\sqrt{\frac{-1+a}{a}}}{\sqrt{2}}\right] \text{Log}\left[1+\frac{\left(-1+\sqrt{1-a^2}\right)\left(\frac{1}{a+b x}+i \sqrt{1-\frac{1}{(a+b x)^2}}\right)}{a}\right]-$$

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

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

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

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

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

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

Optimal (type 4, 244 leaves, 12 steps) :

$$-\frac{b\,\text{ArcSec}[a+b\,x]^2}{a}-\frac{\text{ArcSec}[a+b\,x]^2}{x}-\frac{2\,\mathrm{i}\,b\,\text{ArcSec}[a+b\,x]\,\text{Log}\left[1-\frac{a\,e^{\mathrm{i}\,\text{ArcSec}[a+b\,x]}}{1-\sqrt{1-a^2}}\right]}{a\,\sqrt{1-a^2}}+$$

$$\frac{2\,\mathrm{i}\,b\,\text{ArcSec}[a+b\,x]\,\text{Log}\left[1-\frac{a\,e^{\mathrm{i}\,\text{ArcSec}[a+b\,x]}}{1+\sqrt{1-a^2}}\right]}{a\,\sqrt{1-a^2}}-\frac{2\,b\,\text{PolyLog}\left[2,\frac{a\,e^{\mathrm{i}\,\text{ArcSec}[a+b\,x]}}{1-\sqrt{1-a^2}}\right]}{a\,\sqrt{1-a^2}}+\frac{2\,b\,\text{PolyLog}\left[2,\frac{a\,e^{\mathrm{i}\,\text{ArcSec}[a+b\,x]}}{1+\sqrt{1-a^2}}\right]}{a\,\sqrt{1-a^2}}$$

Result (type 4, 686 leaves) :

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

$$\frac{1}{\sqrt{-1+a^2}}\,2\,b\left(2\,\text{ArcSec}[a+b\,x]\,\text{ArcTanh}\left[\frac{(-1+a)\,\text{Cot}\left[\frac{1}{2}\,\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]-2\,\text{ArcCos}\left[\frac{1}{a}\right]\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\,\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]+\right.$$

$$\left(\text{ArcCos}\left[\frac{1}{a}\right]-2\,i\,\text{ArcTanh}\left[\frac{(-1+a)\,\text{Cot}\left[\frac{1}{2}\,\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]+2\,i\,\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\,\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]\right)$$

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

$$\left.2\,i\left(\text{ArcTanh}\left[\frac{(-1+a)\,\text{Cot}\left[\frac{1}{2}\,\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]-\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\,\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{-1+a^2}\;e^{\frac{1}{2}\,i\,\text{ArcSec}[a+b\,x]}}{\sqrt{2}\,\sqrt{a}\,\sqrt{-\frac{b\,x}{a+b\,x}}}\right]-$$

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

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

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

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

Problem 33: Unable to integrate problem.

$$\int x^2 \operatorname{ArcSec}[a+b x]^3 \, dx$$

Optimal (type 4, 494 leaves, 25 steps):

$$\frac{(a+b x) \operatorname{ArcSec}[a+b x]}{b^3}-\frac{3 i a \operatorname{ArcSec}[a+b x]^2}{b^3}+\frac{3 a (a+b x) \sqrt{1-\frac{1}{(a+b x)^2}} \operatorname{ArcSec}[a+b x]^2}{b^3}-\frac{(a+b x)^2 \sqrt{1-\frac{1}{(a+b x)^2}} \operatorname{ArcSec}[a+b x]^2}{2 b^3}+\frac{a^3 \operatorname{ArcSec}[a+b x]^3}{3 b^3}+\frac{1}{3} x^3 \operatorname{ArcSec}[a+b x]^3+\frac{i \operatorname{ArcSec}[a+b x]^2 \operatorname{ArcTan}\left[e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}+\frac{6 i a^2 \operatorname{ArcSec}[a+b x]^2 \operatorname{ArcTan}\left[e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}-\frac{\operatorname{ArcTanh}\left[\sqrt{1-\frac{1}{(a+b x)^2}}\right]}{b^3}+\frac{6 a \operatorname{ArcSec}[a+b x] \operatorname{Log}\left[1+e^{2 i \operatorname{ArcSec}[a+b x]}\right]}{b^3}-\frac{i \operatorname{ArcSec}[a+b x] \operatorname{PolyLog}\left[2,-i e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}-\frac{6 i a^2 \operatorname{ArcSec}[a+b x] \operatorname{PolyLog}\left[2,-i e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}+\frac{i \operatorname{ArcSec}[a+b x] \operatorname{PolyLog}\left[2,i e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}+\frac{6 i a^2 \operatorname{ArcSec}[a+b x] \operatorname{PolyLog}\left[2,i e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}-\frac{3 i a \operatorname{PolyLog}\left[2,-e^{2 i \operatorname{ArcSec}[a+b x]}\right]}{b^3}+\frac{\operatorname{PolyLog}\left[3,-i e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}+\frac{6 a^2 \operatorname{PolyLog}\left[3,-i e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}-\frac{\operatorname{PolyLog}\left[3,i e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}-\frac{6 a^2 \operatorname{PolyLog}\left[3,i e^{i \operatorname{ArcSec}[a+b x]}\right]}{b^3}$$

Result (type 8, 14 leaves):

$$\int x^2 \operatorname{ArcSec}[a+b x]^3 \, dx$$

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

$$\int \frac{\operatorname{ArcSec}[a+b x]^3}{x} \, dx$$

Optimal (type 4, 430 leaves, 20 steps):

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

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

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

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

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

Result (type 4, 1058 leaves) :

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

$$6\,\text{ArcSec}[a+b\,x]^2\,\text{ArcSin}\left[\frac{\sqrt{\frac{-1+a}{a}}}{\sqrt{2}}\right]\text{Log}\left[1+\frac{\left(-1+\sqrt{1-a^2}\right)e^{i\,\text{ArcSec}[a+b\,x]}}{a}\right]+2\,\text{ArcSec}[a+b\,x]^3\,\text{Log}\left[1-\frac{a\,e^{i\,\text{ArcSec}[a+b\,x]}}{1+\sqrt{1-a^2}}\right]+$$

$$\text{ArcSec}[a+b\,x]^3\,\text{Log}\left[1-\frac{\left(1+\sqrt{1-a^2}\right)e^{i\,\text{ArcSec}[a+b\,x]}}{a}\right]+6\,\text{ArcSec}[a+b\,x]^2\,\text{ArcSin}\left[\frac{\sqrt{\frac{-1+a}{a}}}{\sqrt{2}}\right]\text{Log}\left[1-\frac{\left(1+\sqrt{1-a^2}\right)e^{i\,\text{ArcSec}[a+b\,x]}}{a}\right]-$$

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

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

$$6\,\text{ArcSec}[a+b\,x]^2\,\text{ArcSin}\left[\frac{\sqrt{\frac{-1+a}{a}}}{\sqrt{2}}\right]\text{Log}\left[1+\frac{\left(-1+\sqrt{1-a^2}\right)\left(\frac{1}{a+b\,x}+i\sqrt{1-\frac{1}{(a+b\,x)^2}}\right)}{a}\right]-$$

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

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

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

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

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

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

$$\int \frac{\text{ArcSec}[a+b\,x]^3}{x^2}\,dx$$

Optimal (type 4, 362 leaves, 14 steps):

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

Result (type 4, 1664 leaves):

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

$$6\,b\,x\,\text{ArcCos}\left[-\frac{1}{a}\right]\,\text{ArcSec}[a+b\,x]\,\text{Log}\left[\frac{\sqrt{-1+a^2}\,e^{-\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]}}{\sqrt{2}\,\sqrt{a}\,\sqrt{1+a\,\text{Cosh}\left[2\,\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]\right]}}\right]+$$

$$12\,b\,x\,\text{ArcSec}[a+b\,x]\,\text{ArcTan}\left[\text{Cot}\left[\frac{1}{2}\,\text{ArcSec}[a+b\,x]\right]\right]\,\text{Log}\left[\frac{\sqrt{-1+a^2}\,e^{-\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]}}{\sqrt{2}\,\sqrt{a}\,\sqrt{1+a\,\text{Cosh}\left[2\,\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]\right]}}\right]+$$

$$12\,b\,x\,\text{ArcSec}[a+b\,x]\,\text{ArcTan}\left[\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right]\text{Log}\left[\frac{\sqrt{-1+a^2}\;e^{-\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]}}{\sqrt{2}\,\sqrt{a}\,\sqrt{1+a\,\text{Cosh}\left[2\,\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]\right]}}\right]+$$

$$6\,b\,x\,\text{ArcCos}\left[-\frac{1}{a}\right]\text{ArcSec}[a+b\,x]\,\text{Log}\left[\frac{\sqrt{-1+a^2}\;e^{\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]}}{\sqrt{2}\,\sqrt{a}\,\sqrt{1+a\,\text{Cosh}\left[2\,\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]\right]}}\right]-$$

$$12\,b\,x\,\text{ArcSec}[a+b\,x]\,\text{ArcTan}\left[\text{Cot}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right]\text{Log}\left[\frac{\sqrt{-1+a^2}\;e^{\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]}}{\sqrt{2}\,\sqrt{a}\,\sqrt{1+a\,\text{Cosh}\left[2\,\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]\right]}}\right]-$$

$$12\,b\,x\,\text{ArcSec}[a+b\,x]\,\text{ArcTan}\left[\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right]\text{Log}\left[\frac{\sqrt{-1+a^2}\;e^{\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]}}{\sqrt{2}\,\sqrt{a}\,\sqrt{1+a\,\text{Cosh}\left[2\,\text{ArcTanh}\left[\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right]\right]}}\right]-$$

$$6\,b\,x\,\text{ArcCos}\left[-\frac{1}{a}\right]\text{ArcSec}[a+b\,x]\,\text{Log}\left[\frac{\left(-1+a^2\right)\sqrt{-\frac{b\,x}{(-1+a)\,(1+a+b\,x)}}}{\sqrt{a}\,\sqrt{-\frac{\left(-1+a^2\right)(a+b\,x)}{b\,x}}\left(\sqrt{-1+a^2}+(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right)}\right]-$$

$$12\,b\,x\,\text{ArcSec}[a+b\,x]\,\text{ArcTan}\left[\text{Cot}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right]\text{Log}\left[\frac{\left(-1+a^2\right)\sqrt{-\frac{b\,x}{(-1+a)\,(1+a+b\,x)}}}{\sqrt{a}\,\sqrt{-\frac{\left(-1+a^2\right)(a+b\,x)}{b\,x}}\left(\sqrt{-1+a^2}+(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right)}\right]-$$

$$12\,b\,x\,\text{ArcSec}[a+b\,x]\,\text{ArcTan}\left[\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right]\text{Log}\left[\frac{\left(-1+a^2\right)\sqrt{-\frac{b\,x}{(-1+a)\,(1+a+b\,x)}}}{\sqrt{a}\,\sqrt{-\frac{\left(-1+a^2\right)\,(a+b\,x)}{b\,x}}\,\left(\sqrt{-1+a^2}+(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right)}\right]-$$

$$6\,b\,x\,\text{ArcCos}\left[-\frac{1}{a}\right]\text{ArcSec}[a+b\,x]\,\text{Log}\left[\frac{\sqrt{-1+a^2}+(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{2\sqrt{a}\,\sqrt{-\frac{\left(-1+a^2\right)\,(a+b\,x)}{b\,x}}\,\sqrt{-\frac{b\,x}{(-1+a)\,(1+a+b\,x)}}}\right]+$$

$$12\,b\,x\,\text{ArcSec}[a+b\,x]\,\text{ArcTan}\left[\text{Cot}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right]\text{Log}\left[\frac{\sqrt{-1+a^2}+(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{2\sqrt{a}\,\sqrt{-\frac{\left(-1+a^2\right)\,(a+b\,x)}{b\,x}}\,\sqrt{-\frac{b\,x}{(-1+a)\,(1+a+b\,x)}}}\right]+$$

$$12\,b\,x\,\text{ArcSec}[a+b\,x]\,\text{ArcTan}\left[\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]\right]\text{Log}\left[\frac{\sqrt{-1+a^2}+(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{2\sqrt{a}\,\sqrt{-\frac{\left(-1+a^2\right)\,(a+b\,x)}{b\,x}}\,\sqrt{-\frac{b\,x}{(-1+a)\,(1+a+b\,x)}}}\right]-$$

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

$$3\,b\,x\,\text{ArcSec}[a+b\,x]^2\,\text{Log}\left[\frac{\left(-1+a+i\sqrt{-1+a^2}\right)\left(1+\frac{(1+a)\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}{\sqrt{-1+a^2}}\right)}{a+i\,a\,\text{Tan}\left[\frac{1}{2}\text{ArcSec}[a+b\,x]\right]}\right]+6\,i\,b\,x\,\text{ArcSec}[a+b\,x]$$

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

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

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

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

Optimal (type 3, 58 leaves, 7 steps):

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

Result (type 3, 154 leaves):

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

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

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

Optimal (type 3, 58 leaves, 7 steps):

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

Result (type 3, 154 leaves):

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

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

$$\int x^3 \left(a + b \operatorname{ArcSec}\left[c + d x^4\right]\right) dx$$

Optimal (type 3, 58 leaves, 7 steps):

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

Result (type 3, 137 leaves):

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

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

$$\int x^{-1+n} \text{ArcSec}\left[a+b x^n\right] \, dx$$

Optimal (type 3, 49 leaves, 6 steps):

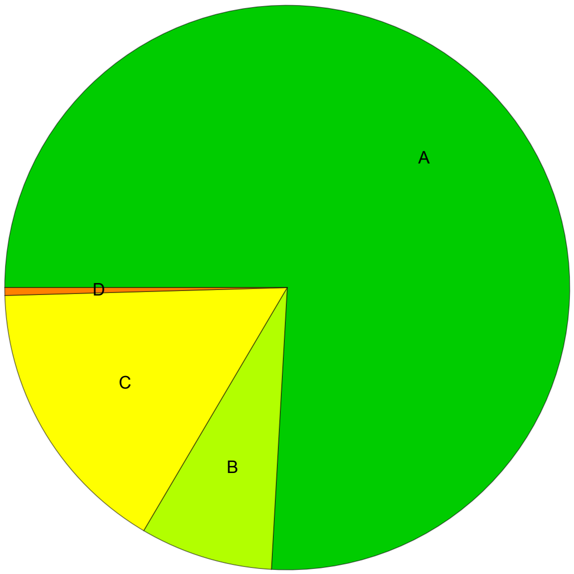
$$\frac{\left(a+b x^n\right) \text{ArcSec}\left[a+b x^n\right]}{b n}-\frac{\text{ArcTanh}\left[\sqrt{1-\frac{1}{\left(a+b x^n\right)^2}}\right]}{b n}$$

Result (type 3, 130 leaves):

$$\frac{\left(a+b x^n\right) \text{ArcSec}\left[a+b x^n\right]}{b n}-\frac{\sqrt{-1+\left(a+b x^n\right)^2}\left(-\text{Log}\left[1-\frac{a+b x^n}{\sqrt{-1+\left(a+b x^n\right)^2}}\right]+\text{Log}\left[1+\frac{a+b x^n}{\sqrt{-1+\left(a+b x^n\right)^2}}\right]\right)}{2 b n\left(a+b x^n\right) \sqrt{1-\frac{1}{\left(a+b x^n\right)^2}}}$$

Summary of Integration Test Results

224 integration problems



A - 170 optimal antiderivatives

B - 17 more than twice size of optimal antiderivatives

C - 36 unnecessarily complex antiderivatives

D - 1 unable to integrate problems

E - 0 integration timeouts