Mathematica 11.3 Integration Test Results

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

Problem 63: Result unnecessarily involves imaginary or complex numbers.

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

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

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

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

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

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

Result (type 4, 333 leaves):

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

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

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

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

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

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):

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

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) :

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

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

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

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) :

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

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

$$c\,d\,\text{EllipticF}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{-\frac{c}{c\,d+e}}\sqrt{d+e\,x}\right],\frac{c\,d+e}{c\,d-e}\right]+$$

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

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

Problem 68: Result unnecessarily involves imaginary or complex numbers.

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

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

$$-\frac{4 b e \left(1-c^2 x^2\right)}{15 c d \left(c^2 d^2-e^2\right) \sqrt{1-\frac{1}{c^2 x^2}}\, x \left(d+e x\right)^{3/2}}-\frac{16 b c e \left(1-c^2 x^2\right)}{15 \left(c^2 d^2-e^2\right)^2 \sqrt{1-\frac{1}{c^2 x^2}}\, x \sqrt{d+e x}}-$$

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

$$\left(4 b \left(7 c^2 d^2-3 e^2\right) \sqrt{d+e x} \sqrt{1-c^2 x^2}\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{1-c x}}{\sqrt{2}}\right], \frac{2 e}{c d+e}\right]\right) \Big/$$

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

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

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

Result (type 4, 407 leaves) :

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

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

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

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

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

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

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) :

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

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

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

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

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

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

Result (type 4, 1362 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 4, 1213 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 3, 286 leaves):

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

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

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

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

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

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

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

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

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

Result (type 4, 1190 leaves):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 4, 1805 leaves):

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

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

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

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

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

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

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

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

$$\left.\left(\left(2\,c^2\,d+e\right)\left(i\sqrt{d}+\sqrt{e}\,x\right)\right)\right]\right)+$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 3, 389 leaves):

$$-\frac{1}{16 e^2}\left(-\frac{4 a d}{\left(d+e x^2\right)^2}+\frac{8 a}{d+e x^2}-\frac{2 b c e \sqrt{1-\frac{1}{c^2 x^2}}\, x}{\left(c^2 d+e\right)\left(d+e x^2\right)}+\frac{4 b \left(d+2 e x^2\right) \text{ArcSec}[c x]}{\left(d+e x^2\right)^2}+\frac{4 b \,\text{ArcSin}\left[\frac{1}{c x}\right]}{d}+\frac{1}{d \left(-c^2 d-e\right)^{3/2}} b \sqrt{e}\left(c^2 d+2 e\right) \text{Log}\left[-\left(\left(16 d \sqrt{-c^2 d-e}\, e^{3/2}\left(\sqrt{e}+c\left(\text{i} c \sqrt{d}-\sqrt{-c^2 d-e}\sqrt{1-\frac{1}{c^2 x^2}}\right) x\right)\right)\Big/\left(b \left(c^2 d+2 e\right)\left(\text{i} \sqrt{d}+\sqrt{e}\, x\right)\right)\right)\right]+\frac{1}{d \left(-c^2 d-e\right)^{3/2}} b \sqrt{e}\left(c^2 d+2 e\right) \text{Log}\left[\left(16 \text{i} d \sqrt{-c^2 d-e}\, e^{3/2}\left(-\sqrt{e}+c\left(\text{i} c \sqrt{d}+\sqrt{-c^2 d-e}\sqrt{1-\frac{1}{c^2 x^2}}\right) x\right)\right)\Big/\left(b \left(c^2 d+2 e\right)\left(\sqrt{d}+\text{i} \sqrt{e}\, x\right)\right)\right]\right)$$

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):

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

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

$$\left.\left.\left.\left(b\,\left(3\,c^2\,d+2\,e\right)\,\left(i\,\sqrt{d}+\sqrt{e}\,x\right)\right)\right)\right]\right)\Big/\left(d^2\,\left(-c^2\,d-e\right)^{3/2}\,\sqrt{e}\right)-$$

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

$$\left.\left.\left.\left(b\,\left(3\,c^2\,d+2\,e\right)\,\left(\sqrt{d}+i\,\sqrt{e}\,x\right)\right)\right]\right)\Big/\left(d^2\,\left(-c^2\,d-e\right)^{3/2}\,\sqrt{e}\right)\right)$$

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):

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

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

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

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

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

$$\left(\left(2 c^2 d+e\right) \left(-i \sqrt{d}+\sqrt{e} x\right)\right)\Bigg)\Bigg]\Bigg)\Bigg)\Bigg)+\frac{1}{16 d^2}$$

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

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

$$\left.\left(\left(2 c^2 d+e\right) \left(i \sqrt{d}+\sqrt{e} x\right)\right)\Bigg]\right)+\frac{1}{d^3}$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 111: Result unnecessarily involves higher level functions.

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

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

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

Result (type 6, 706 leaves):

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

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

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

$$\left(\left(35 c^6 d^2 e^2 x^2-63 c^4 d e^3 x^2-75 c^2 e^4 x^2+c^8 d^3 \left(128 d-105 e x^2\right)\right)\right.$$

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

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

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

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

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

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

$$\frac{1}{1680 c^5 e^3} \sqrt{d+e x^2} \left(16 a c^5 \left(8 d^3-4 d^2 e x^2+3 d e^2 x^4+15 e^3 x^6\right)-\right.$$

$$b\, e \sqrt{1-\frac{1}{c^2 x^2}}\, x$$

$$\left(75 e^2+2 c^2 e \left(19 d+25 e x^2\right)+c^4 \left(-41 d^2+22 d e x^2+40 e^2 x^4\right)\right)+$$

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

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

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

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

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

Result (type 6, 628 leaves):

$$\left(b d \sqrt{1-\frac{1}{c^2 x^2}}\, x^3\left(\left(15 c^4 d^2-10 c^2 d e-9 e^2\right) \operatorname{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right]\left(c^2 d \operatorname{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]-e \operatorname{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]\right)+4 \operatorname{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]\left(\left(10 c^4 d e^2 x^2+9 c^2 e^3 x^2+c^6 d^2\left(16 d-15 e x^2\right)\right) \operatorname{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right]+4 c^6 d^2 x^2\left(-e \operatorname{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]+c^2 d \operatorname{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]\right)\right)\right)\right)\Big/$$

$$\left(60 c^3 e\left(-1+c^2 x^2\right) \sqrt{d+e x^2}\left(-4 c^2 e x^2 \operatorname{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]+c^2 d \operatorname{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]-e \operatorname{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]\right)\left(4 d \operatorname{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right]+x^2\left(-e \operatorname{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]+c^2 d \operatorname{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]\right)\right)\right)+$$

$$\frac{1}{120 c^3 e^2}\sqrt{d+e x^2}\left(8 a c^3\left(-2 d^2+d e x^2+3 e^2 x^4\right)-b e \sqrt{1-\frac{1}{c^2 x^2}}\, x\left(9 e+c^2\left(7 d+6 e x^2\right)\right)+8 b c^3\left(-2 d^2+d e x^2+3 e^2 x^4\right) \operatorname{ArcSec}[c x]\right)$$

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):

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

Result (type 6, 548 leaves):

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

Problem 119: Unable to integrate problem.

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

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

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

Result (type 8, 25 leaves):

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

Problem 120: Unable to integrate problem.

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

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

$$\frac{b c \left(24 c^4 d^2+19 c^2 d e-31 e^2\right) \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}}{225 d^2 \sqrt{c^2 x^2}}+\frac{b c \left(12 c^2 d-e\right) \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}}{225 d x^2 \sqrt{c^2 x^2}}+\frac{b c \sqrt{-1+c^2 x^2} \left(d+e x^2\right)^{3/2}}{25 d x^4 \sqrt{c^2 x^2}}-\frac{\left(d+e x^2\right)^{3/2} (a+b \text{ArcSec}[c x])}{5 d x^5}+\frac{2 e \left(d+e x^2\right)^{3/2} (a+b \text{ArcSec}[c x])}{15 d^2 x^3}-\left(b c^2 \left(24 c^4 d^2+19 c^2 d e-31 e^2\right) x \sqrt{1-c^2 x^2} \sqrt{d+e x^2} \text{EllipticE}\left[\text{ArcSin}[c x],-\frac{e}{c^2 d}\right]\right)\Big/\left(225 d^2 \sqrt{c^2 x^2} \sqrt{-1+c^2 x^2} \sqrt{1+\frac{e x^2}{d}}\right)+\left(b \left(c^2 d+e\right) \left(24 c^4 d^2+7 c^2 d e-30 e^2\right) x \sqrt{1-c^2 x^2} \sqrt{1+\frac{e x^2}{d}} \text{EllipticF}\left[\text{ArcSin}[c x],-\frac{e}{c^2 d}\right]\right)\Big/\left(225 d^2 \sqrt{c^2 x^2} \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}\right)$$

Result (type 8, 25 leaves):

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

Problem 121: Result unnecessarily involves higher level functions.

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

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

$$\frac{b \left(3 c^4 d^2-38 c^2 d e-25 e^2\right) x \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}}{560 c^5 e \sqrt{c^2 x^2}}-\frac{b \left(13 c^2 d+25 e\right) x \sqrt{-1+c^2 x^2} \left(d+e x^2\right)^{3/2}}{840 c^3 e \sqrt{c^2 x^2}}-\frac{b x \sqrt{-1+c^2 x^2} \left(d+e x^2\right)^{5/2}}{42 c e \sqrt{c^2 x^2}}-\frac{d \left(d+e x^2\right)^{5/2} (a+b \text{ArcSec}[c x])}{5 e^2}+\frac{\left(d+e x^2\right)^{7/2} (a+b \text{ArcSec}[c x])}{7 e^2}-\frac{2 b c d^{7/2} x \text{ArcTan}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d} \sqrt{-1+c^2 x^2}}\right]}{35 e^2 \sqrt{c^2 x^2}}+\frac{b \left(35 c^6 d^3-35 c^4 d^2 e-63 c^2 d e^2-25 e^3\right) x \text{ArcTanh}\left[\frac{\sqrt{e} \sqrt{-1+c^2 x^2}}{c \sqrt{d+e x^2}}\right]}{560 c^6 e^{3/2} \sqrt{c^2 x^2}}$$

Result (type 6, 679 leaves):

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

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

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

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

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

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

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

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

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

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

$$\frac{1}{1680 c^5 e^2}\sqrt{d+e x^2}\left(48 a c^5\left(2 d-5 e x^2\right)\left(d+e x^2\right)^2+\right.$$

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

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

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):

$$-\frac{b\left(7c^2d+3e\right)x\sqrt{-1+c^2x^2}\sqrt{d+ex^2}}{40c^3\sqrt{c^2x^2}}-\frac{bx\sqrt{-1+c^2x^2}\left(d+ex^2\right)^{3/2}}{20c\sqrt{c^2x^2}}+\frac{\left(d+ex^2\right)^{5/2}\left(a+b\,\text{ArcSec}[c\,x]\right)}{5e}+\frac{b\,c\,d^{5/2}x\,\text{ArcTan}\left[\frac{\sqrt{d+ex^2}}{\sqrt{d}\sqrt{-1+c^2x^2}}\right]}{5e\sqrt{c^2x^2}}-\frac{b\left(15c^4d^2+10c^2de+3e^2\right)x\,\text{ArcTanh}\left[\frac{\sqrt{e}\sqrt{-1+c^2x^2}}{c\sqrt{d+ex^2}}\right]}{40c^4\sqrt{e}\sqrt{c^2x^2}}$$

Result (type 6, 604 leaves):

$$\left(b\,d\sqrt{1-\frac{1}{c^2x^2}}\,x^3\left(-\left(15c^4d^2+10c^2de+3e^2\right)\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2x^2,-\frac{ex^2}{d}\right]\left(c^2d\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2x^2},-\frac{d}{ex^2}\right]-e\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2x^2},-\frac{d}{ex^2}\right]\right)+\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2x^2},-\frac{d}{ex^2}\right]\left(\left(40c^4de^2x^2+12c^2e^3x^2+4c^6d^2\left(-8d+15ex^2\right)\right)\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2x^2,-\frac{ex^2}{d}\right]+8c^6d^2x^2\left(e\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2x^2,-\frac{ex^2}{d}\right]-c^2d\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2x^2,-\frac{ex^2}{d}\right]\right)\right)\right)\right)\Bigg/$$

$$\left(20c^3\left(-1+c^2x^2\right)\sqrt{d+ex^2}\left(-4c^2ex^2\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2x^2},-\frac{d}{ex^2}\right]+c^2d\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2x^2},-\frac{d}{ex^2}\right]-e\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2x^2},-\frac{d}{ex^2}\right]\right)\left(4d\,\text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2x^2,-\frac{ex^2}{d}\right]+x^2\left(-e\,\text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2x^2,-\frac{ex^2}{d}\right]+c^2d\,\text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2x^2,-\frac{ex^2}{d}\right]\right)\right)\right)+$$

$$\frac{1}{40c^3e}\sqrt{d+ex^2}\left(8ac^3\left(d+ex^2\right)^2-be\sqrt{1-\frac{1}{c^2x^2}}\,x\left(3e+c^2\left(9d+2ex^2\right)\right)+8bc^3\left(d+ex^2\right)^2\text{ArcSec}[c\,x]\right)$$

Problem 129: Unable to integrate problem.

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

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

$$\frac{b\,c\,\left(8\,c^4\,d^2+23\,c^2\,d\,e+23\,e^2\right)\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{75\,d\,\sqrt{c^2\,x^2}}+\frac{4\,b\,c\,\left(c^2\,d+2\,e\right)\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}{75\,x^2\,\sqrt{c^2\,x^2}}+$$
$$\frac{b\,c\,\sqrt{-1+c^2\,x^2}\,\left(d+e\,x^2\right)^{3/2}}{25\,x^4\,\sqrt{c^2\,x^2}}-\frac{\left(d+e\,x^2\right)^{5/2}\,\left(a+b\,\text{ArcSec}[c\,x]\right)}{5\,d\,x^5}-$$
$$\left(b\,c^2\,\left(8\,c^4\,d^2+23\,c^2\,d\,e+23\,e^2\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{d+e\,x^2}\,\text{EllipticE}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]\right)\Big/$$
$$\left(75\,d\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\right)+$$
$$\left(b\,\left(c^2\,d+e\right)\,\left(8\,c^4\,d^2+19\,c^2\,d\,e+15\,e^2\right)\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]\right)\Big/$$
$$\left(75\,d\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}\right)$$

Result (type 8, 25 leaves):

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

Problem 130: Unable to integrate problem.

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

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

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

Result (type 8, 25 leaves):

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

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):

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

Result (type 6, 629 leaves) :

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

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

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

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

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

Result (type 6, 555 leaves):

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

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

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

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

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

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):

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

Problem 139: Unable to integrate problem.

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

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

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

Result (type 8, 25 leaves):

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

Problem 140: Unable to integrate problem.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 8, 25 leaves):

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

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

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

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

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

Result (type 6, 587 leaves):

$$\left(b\, d \sqrt{1-\frac{1}{c^2 x^2}}\, x^3 \left(\left(9 c^2 d-e\right) \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right] \left(c^2 d\, \text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]- e\, \text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]\right)+4\, \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right] \left(\left(c^2 e^2 x^2+c^4 d \left(16 d-9 e x^2\right)\right) \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right]+4 c^4 d x^2 \left(-e\, \text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]+c^2 d\, \text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]\right)\right)\right)\right)\Big/$$

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

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

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):

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

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):

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

Result (type 6, 190 leaves):

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

Problem 149: Unable to integrate problem.

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

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

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

Result (type 8, 25 leaves):

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

Problem 150: Unable to integrate problem.

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

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

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

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

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

$$\left(9 d^3 \sqrt{c^2 x^2} \sqrt{-1+c^2 x^2} \sqrt{1+\frac{e x^2}{d}}\right)+$$

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

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

$$\left(9 d^2 \sqrt{c^2 x^2} \sqrt{-1+c^2 x^2} \sqrt{d+e x^2}\right)-$$

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

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

Result (type 8, 25 leaves):

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

Problem 151: Result unnecessarily involves higher level functions.

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

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

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

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

Result (type 6, 417 leaves):

$$\left(2 b c d \sqrt{1-\frac{1}{c^2 x^2}}\, x^3 \left(\left(8 c^2 \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]\right)\Big/\left(4 c^2 e x^2 \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]-c^2 d \text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]+e \text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,\frac{1}{c^2 x^2},-\frac{d}{e x^2}\right]\right)-\left(3 \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right]\right)\Big/\left(4 d \text{AppellF1}\left[1,\frac{1}{2},\frac{1}{2},2,c^2 x^2,-\frac{e x^2}{d}\right]+x^2 \left(-e \text{AppellF1}\left[2,\frac{1}{2},\frac{3}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]+c^2 d \text{AppellF1}\left[2,\frac{3}{2},\frac{1}{2},3,c^2 x^2,-\frac{e x^2}{d}\right]\right)\right)\right)\right)\Big/\left(3 e^2 \left(-1+c^2 x^2\right) \sqrt{d+e x^2}\right)+\left(-b c d e \sqrt{1-\frac{1}{c^2 x^2}}\, x \left(d+e x^2\right)+a \left(c^2 d+e\right) \left(8 d^2+12 d e x^2+3 e^2 x^4\right)+b \left(c^2 d+e\right) \left(8 d^2+12 d e x^2+3 e^2 x^4\right) \text{ArcSec}[c x]\right)\Big/\left(3 e^3 \left(c^2 d+e\right) \left(d+e x^2\right)^{3/2}\right)$$

Problem 152: Result unnecessarily involves higher level functions.

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

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

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

Result (type 6, 269 leaves):

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

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):

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

Problem 159: Unable to integrate problem.

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

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 8, 22 leaves) :

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

Problem 160: Unable to integrate problem.

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

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

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

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

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

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

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

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

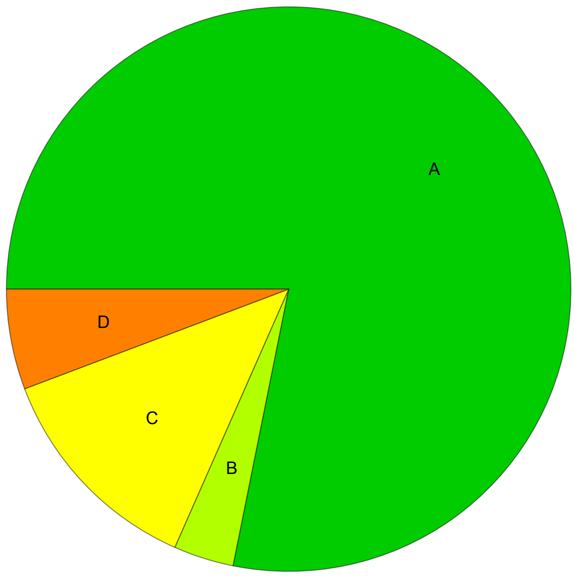
$$\frac{8\,b\,e\,x\,\sqrt{1-c^2\,x^2}\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{EllipticF}\left[\text{ArcSin}[c\,x],-\frac{e}{c^2\,d}\right]}{3\,d^3\,\sqrt{c^2\,x^2}\,\sqrt{-1+c^2\,x^2}\,\sqrt{d+e\,x^2}}$$

Result (type 8, 25 leaves) :

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

Summary of Integration Test Results

174 integration problems



A - 136 optimal antiderivatives

B - 6 more than twice size of optimal antiderivatives

C - 22 unnecessarily complex antiderivatives

D - 10 unable to integrate problems

E - 0 integration timeouts