Mathematica 11.3 Integration Test Results

Test results for the 108 problems in "5.1.4b (f x) n (d+e x 2) p (a+b arcsin(c x)) n .m"

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

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

Optimal (type 4, 705 leaves, 27 steps):

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

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

Result (type 4, 1547 leaves):

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

$$b = \frac{ \left(\begin{array}{c} 7 \text{ i} \sqrt{d} \end{array} \left(\begin{array}{c} \frac{\text{ArcSin}[c \, x]}{-\text{i} \sqrt{d} + \sqrt{e} \, x} + \frac{c \, \text{Log} \left[-\frac{2 \, e \left[\sqrt{e} \, -\text{i} \, c^2 \, \sqrt{d} \, \, x + \sqrt{c^2 \, d + e} \, \sqrt{1 - c^2 \, x^2} \, \right]}{c \, \sqrt{c^2 \, d + e} \, \left[-\text{i} \, \sqrt{d} + \sqrt{e} \, \, x \right]} \right]}{\sqrt{c^2 \, d + e}} \right)}{16 \, e^3} = \frac{16 \, e^3}{ }$$

$$\begin{split} \frac{1}{16\,e^{5/2}} d \left(-\frac{c\,\sqrt{1-c^2\,x^2}}{\left(c^2\,d + e\right)\,\left(-\,\mathrm{i}\,\,\sqrt{d}\,\,+\,\sqrt{e}\,\,x\right)} - \frac{\mathsf{ArcSin}\,[\,c\,\,x\,]}{\sqrt{e}\,\,\left(-\,\mathrm{i}\,\,\sqrt{d}\,\,+\,\sqrt{e}\,\,x\right)^2} - \right. \\ \left(\mathrm{i}\,\,c^3\,\,\sqrt{d}\,\,\left(\mathsf{Log}\,[\,4]\,\,+\,\mathsf{Log}\,[\,\left(e\,\,\sqrt{c^2\,d + e}\,\,\left(\sqrt{e}\,\,-\,\mathrm{i}\,\,c^2\,\,\sqrt{d}\,\,x + \sqrt{c^2\,d + e}\,\,\sqrt{1-c^2\,x^2}\,\,\right)\,\right) \right) \right/ \\ \left. \left(c^3\,\left(d + \mathrm{i}\,\,\sqrt{d}\,\,\sqrt{e}\,\,x\right)\,\right) \,\right] \right) \right) / \left(\sqrt{e}\,\,\left(c^2\,d + e\right)^{3/2}\right) \right) - \\ 7\,\,\mathrm{i}\,\,\sqrt{d} \left(-\frac{\mathsf{ArcSin}\,[\,c\,\,x\,]}{\mathrm{i}\,\,\sqrt{d}\,\,+\,\sqrt{e}\,\,x} - \frac{c\,\,\mathsf{Log}\,\left[\frac{2\,e\,\left(\sqrt{e}\,\,+\,\mathrm{i}\,c^2\,\sqrt{d}\,\,x + \sqrt{c^2\,d + e}\,\,\sqrt{1-c^2\,x^2}\,\,\right)}{c\,\,\sqrt{c^2\,d + e}\,\,}\right]}{\sqrt{c^2\,d + e}} \right)}{\sqrt{c^2\,d + e}} - \frac{1}{16\,e^{5/2}} \\ d \left(-\frac{c\,\,\sqrt{1-c^2\,x^2}}{\left(c^2\,d + e\right)\,\left(\mathrm{i}\,\,\sqrt{d}\,\,+\,\sqrt{e}\,\,x\right)} - \frac{\mathsf{ArcSin}\,[\,c\,\,x\,]}{\sqrt{e}\,\,\left(\mathrm{i}\,\,\sqrt{d}\,\,+\,\sqrt{e}\,\,x\right)^2} + \end{split}$$

$$\begin{split} d & \left[-\frac{c \, \sqrt{1-c^2 \, x^2}}{\left(c^2 \, d + e\right) \, \left(\dot{\mathbb{1}} \, \sqrt{d} \, + \sqrt{e} \, \, x\right)} - \frac{\text{ArcSin[} c \, x\,]}{\sqrt{e} \, \left(\dot{\mathbb{1}} \, \sqrt{d} \, + \sqrt{e} \, \, x\right)^2} + \\ & \left(\dot{\mathbb{1}} \, c^3 \, \sqrt{d} \, \left(\text{Log[} 4\,] \, + \text{Log[} \left(e \, \sqrt{c^2 \, d + e} \, \left(\sqrt{e} \, + \dot{\mathbb{1}} \, c^2 \, \sqrt{d} \, \, x + \sqrt{c^2 \, d + e} \, \sqrt{1-c^2 \, x^2} \, \right) \right) \right/ \\ & \left(c^3 \, \left(d - \dot{\mathbb{1}} \, \sqrt{d} \, \sqrt{e} \, \, x \right) \right) \, \right] \right) \bigg) \bigg/ \, \left(\sqrt{e} \, \left(c^2 \, d + e \right)^{3/2} \right) \bigg) + \frac{1}{16 \, e^3} \, \left(\dot{\mathbb{1}} \, \left(\pi - 2 \, \text{ArcSin[} c \, x \, \right] \right)^2 - \frac{1}{16 \, e^3} \, \left(\dot{\mathbb{1}} \, \left(\pi - 2 \, \text{ArcSin[} c \, x \, \right) \right) \right) \right) \bigg) \bigg) \bigg) \, d \, \mathcal{O} \bigg) \, d \, \mathcal{O} \bigg) \, d \, \mathcal{O} \bigg] \, d \, \mathcal{O} \bigg[\,$$

$$32 \pm \operatorname{ArcSin} \left[\frac{\sqrt{1 - \frac{\pm c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] \operatorname{ArcTan} \left[\frac{\left(c \sqrt{d} - \pm \sqrt{e} \right) \operatorname{Cot} \left[\frac{1}{4} \left(\pi + 2 \operatorname{ArcSin} \left[c x \right] \right) \right]}{\sqrt{c^2 d + e}} \right] - 4 \left[\pi + 4 \operatorname{ArcSin} \left[\frac{\sqrt{1 - \frac{\pm c \sqrt{d}}{\sqrt{e}}}}{\sqrt{e}} \right] - 2 \operatorname{ArcSin} \left[c x \right] \right]$$

$$\log \left[\frac{e^{-i\operatorname{ArcSin}(cx)} \left(c\sqrt{d} - \sqrt{c^2\,d + e} + \sqrt{e} \, e^{i\operatorname{ArcSin}(cx)} \right)}{\sqrt{e}} \right] - \frac{1}{\sqrt{e}}$$

$$4 \left[\pi - 4\operatorname{ArcSin} \left[\frac{\sqrt{1 - \frac{i\,c\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] - 2\operatorname{ArcSin}(c\,x) \right]$$

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

$$4 \left(\pi - 2\operatorname{ArcSin}(c\,x) \right) \log \left[c\sqrt{d} + i\,c\sqrt{e} \, x \right] + 8\operatorname{ArcSin}(c\,x) \log \left[c\sqrt{d} + i\,c\sqrt{e} \, x \right] + 8\operatorname{ArcSin}(c\,x) + 2\operatorname{ArcSin}(c\,x) + 2\operatorname{ArcSin}(c\,x)$$

4 $(\pi - 2 \operatorname{ArcSin}[c \ x]) \operatorname{Log}[c \ \sqrt{d} - i \ c \ \sqrt{e} \ x] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}[c \ \sqrt{d} - i \ c \ \sqrt{e} \ x] +$

$$8 \ i \ \left[PolyLog \left[2, \ \frac{\left(c \ \sqrt{d} \ - \sqrt{c^2 \ d + e} \ \right) \ e^{-i \ ArcSin[c \ x]}}{\sqrt{e}} \right] + \right.$$

PolyLog[2,
$$\frac{\left(c\sqrt{d} + \sqrt{c^2 d + e}\right) e^{-i \operatorname{ArcSin}[c \times]}}{\sqrt{e}}\right]$$

Problem 49: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 727 leaves, 32 steps):

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

Result (type 4, 1601 leaves):

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

$$b = -\frac{\int \dot{\mathbb{I}} \left(\frac{\frac{ArcSin[c\,x]}{-i\,\sqrt{d}\,+\sqrt{e}\,\,x}}{\frac{ArcSin[c\,x]}{-i\,\sqrt{d}\,+\sqrt{e}\,\,x}} + \frac{c\,Log\left[-\frac{2\,e\left[\sqrt{e}\,-i\,c^2\,\sqrt{d}\,\,x+\sqrt{c^2\,d+e}\,\,\sqrt{1-c^2\,x^2}\,\right]}{c\,\sqrt{c^2\,d+e}}\right]}{\sqrt{c^2\,d+e}} \right)}{16\,d^{5/2}} + \frac{1}{16\,d^2}\sqrt{e} \left(-\frac{c\,\sqrt{1-c^2\,x^2}}{\left(c^2\,d+e\right)\,\left(-\,\dot{\mathbb{I}}\,\,\sqrt{d}\,+\sqrt{e}\,\,x\right)} - \frac{c\,\sqrt{1-c^2\,x^2}}{\left(c^2\,d+e\right)\,\left(-\,\dot{\mathbb{I}}\,\,\sqrt{d}\,+\sqrt{e}\,\,x\right)} - \frac{c\,\sqrt{1-c^2\,x^2}}{\left($$

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

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

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

$$\frac{1}{16\,\text{d}^3}\left(\text{i} \, \left(\pi - 2\,\text{ArcSin}\,[\,c\,x\,]\,\right)^2 - 32\,\,\text{i}\,\,\text{ArcSin}\,\left[\,\frac{\sqrt{1-\frac{\text{i}\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\,\right] \right.$$

$$\label{eq:arcTan} \text{ArcTan} \, \Big[\, \frac{ \left(c \, \sqrt{d} \, - \, \text{$\mathbb{1}$} \, \sqrt{e} \, \right) \, \text{Cot} \left[\, \frac{1}{4} \, \left(\pi + 2 \, \text{ArcSin} \left[\, c \, x \, \right] \, \right) \, \right]}{\sqrt{c^2 \, d + e}} \, \Big] \, - \, \frac{1}{2} \, \left[- \, \frac{1}{4} \, \left(\pi + \frac{1}{4} \, \left(\pi$$

$$4 \left[\pi + 4 \operatorname{ArcSin} \left[\frac{\sqrt{1 - \frac{i c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] - 2 \operatorname{ArcSin} [c x] \right]$$

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

$$4 \left(\pi - 2 \operatorname{ArcSin}[c \ x]\right) \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ \sqrt{e} \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ \sqrt{d} \ + \ \dot{\mathbb{1}} \ c \ x\right] + 8 \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ x\right] \operatorname{Log}\left[c \ x\right] \operatorname{Log}\left[c \ x\right] + \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ x\right] + \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ x\right] \operatorname{Log}\left[c \ x\right] \operatorname{Log}\left[c \ x\right] + \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ x\right] \operatorname{Log}\left[c \ x\right] \operatorname{Log}\left[c \ x\right] + \operatorname{ArcSin}[c \ x] \operatorname{Log}\left[c \ x\right] \operatorname{Log}\left[c \ x$$

$$\text{PolyLog} \Big[2 \text{, } - \frac{\left(\text{c} \sqrt{\text{d}} + \sqrt{\text{c}^2 \, \text{d} + \text{e}} \right) \, \, \text{e}^{-\text{i} \, \text{ArcSin} \left[\, \text{c} \, \text{x} \right]}}{\sqrt{\text{e}}} \Big] \Bigg) \Bigg) - \frac{1}{16 \, \text{d}^3} \left(\text{i} \, \left(\pi - 2 \, \text{ArcSin} \left[\, \text{c} \, \text{x} \right] \right)^2 - \frac{1}{16 \, \text{d}^3} \right) \left(\text{i} \, \left(\pi - 2 \, \text{ArcSin} \left[\, \text{c} \, \text{x} \right] \right)^2 \right) \right) = 0$$

$$32 \ \verb"iArcSin" \Big[\frac{\sqrt{1 + \frac{\verb"i" c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \Big] \ \mathsf{ArcTan} \Big[\frac{\left(\mathsf{c} \ \sqrt{\mathsf{d}} \ + \ \verb"i" \sqrt{\mathsf{e}} \ \right) \ \mathsf{Cot} \left[\frac{1}{4} \left(\pi + 2 \ \mathsf{ArcSin} \left[\mathsf{c} \ \mathsf{x} \right] \ \right) \ \right]}{\sqrt{\mathsf{c}^2 \ \mathsf{d} + \mathsf{e}}} \Big] \ - \frac{1}{2} \left(\frac{1}{4} \left(\pi + \frac{1}{4} \left(\pi$$

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

$$4 \left[\pi + 4 \operatorname{ArcSin} \left[\frac{\sqrt{1 + \frac{i c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] - 2 \operatorname{ArcSin} [c x] \right]$$

$$\label{eq:log_loss} Log\Big[\,\frac{\text{$\mathbb{e}^{-i\,\text{ArcSin}[\,c\,x\,]}\,\left(-\,c\,\sqrt{d}\,\,+\,\sqrt{c^2\,d}\,+\,e^{\,}\,\,+\,\sqrt{e^{\,}}\,\,\text{$\mathbb{e}^{\,i\,\text{ArcSin}[\,c\,x\,]}\,\right)}}{\sqrt{e}}\,\Big]\,\,+\,$$

4
$$\left(\pi$$
 – 2 ArcSin[c x] $\right)$ Log[c \sqrt{d} – i c \sqrt{e} x] + 8 ArcSin[c x] Log[c \sqrt{d} – i c \sqrt{e} x] +

$$8 i \left[PolyLog[2, \frac{\left(c\sqrt{d} - \sqrt{c^2 d + e}\right) e^{-i ArcSin[c x]}}{\sqrt{e}} \right] +$$

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

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

Problem 50: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 783 leaves, 34 steps)

$$\frac{b\,c\,\sqrt{1-c^2\,x^2}}{2\,d^3\,x} + \frac{b\,c\,e^2\,x\,\sqrt{1-c^2\,x^2}}{8\,d^3\,\left(c^2\,d + e\right)\,\left(d + e\,x^2\right)} - \frac{a+b\,ArcSin[c\,x]}{2\,d^3\,x^2} - \frac{e\,\left(a+b\,ArcSin[c\,x]\right)}{4\,d^2\,\left(d + e\,x^2\right)^2} - \frac{e\,\left(a+b\,ArcSin[c\,x]\right)}{4\,d^2\,\left(d + e\,x^2\right)^2} - \frac{e\,\left(a+b\,ArcSin[c\,x]\right)}{4\,d^2\,\left(d + e\,x^2\right)^2} + \frac{b\,c\,e\,ArcTan\left[\frac{\sqrt{c^2\,d + e}\,x}{\sqrt{d}\,\sqrt{1-c^2\,x^2}}\right]}{\sqrt{d^2\,\sqrt{1-c^2\,x^2}}} + \frac{b\,c\,e\,\left(2\,c^2\,d + e\right)\,ArcTan\left[\frac{\sqrt{c^2\,d + e}\,x}{\sqrt{d}\,\sqrt{1-c^2\,x^2}}\right]}{8\,d^{7/2}\,\left(c^2\,d + e\right)^{3/2}} + \frac{3\,e\,\left(a+b\,ArcSin[c\,x]\right)\,Log\left[1 - \frac{\sqrt{e}\,e^{i\,ArcSin[c\,x]}}{i\,c\,\sqrt{-d}\,-\sqrt{c^2\,d + e}}\right]}{2\,d^4} + \frac{3\,e\,\left(a+b\,ArcSin[c\,x]\right)\,Log\left[1 + \frac{\sqrt{e}\,e^{i\,ArcSin[c\,x]}}{i\,c\,\sqrt{-d}\,-\sqrt{c^2\,d + e}}\right]}{2\,d^4} - \frac{3\,e\,\left(a+b\,ArcSin[c\,x]\right)\,Log\left[1 + \frac{\sqrt{e}\,e^{i\,ArcSin[c\,x]}}{i\,c\,\sqrt{-d}\,+\sqrt{c^2\,d + e}}\right]}{2\,d^4} - \frac{3\,i\,b\,e\,PolyLog\left[2, -\frac{\sqrt{e}\,e^{i\,ArcSin[c\,x)}}{i\,c\,\sqrt{-d}\,-\sqrt{c^2\,d + e}}}\right]}{2\,d^4} - \frac{3\,i\,b\,e\,PolyLog\left[2, -\frac{\sqrt{e}\,e^{i\,ArcSin[c\,x)}}{i\,c\,\sqrt{-d}\,-\sqrt{c^2\,d + e}}\right]}{2\,d^4} - \frac{3\,i\,b\,e\,PolyLog\left[2, -\frac{\sqrt{e}\,e^{i\,ArcSin[c\,x)}}{i\,c\,\sqrt{-d}\,-\sqrt{c^2\,d + e}}}\right]}{2\,d^4} - \frac{3\,i\,b\,e\,PolyLog\left[2, -\frac{\sqrt{e}\,e^{i\,ArcSin[c\,x)}}{i\,c\,\sqrt{-d}\,-\sqrt{e^2\,e^{i\,ArcSin[c\,$$

Result (type 4, 1653 leaves):

$$-\frac{a}{2\,d^3\,x^2} - \frac{a\,e}{4\,d^2\,\left(d + e\,x^2\right)^2} - \frac{a\,e}{d^3\,\left(d + e\,x^2\right)} - \frac{3\,a\,e\,Log\left[x\right]}{d^4} + \frac{3\,a\,e\,Log\left[d + e\,x^2\right]}{2\,d^4} + \\ \\ = \left(-\frac{a\,e\,d^3\,x^2}{2\,d^3\,x^2} + \frac{a\,e\,Log\left[x\right]}{d^3\,\left(d + e\,x^2\right)} + \frac{c\,Log\left[-\frac{2\,e\,\left(\sqrt{e^{-i}\,c^2\,\sqrt{d^{-k}\,v^2\,d^{-k}\,q^{-k}\,\sqrt{1-c^2\,x^2}}\right)}{c\,\sqrt{c^2\,d^{-k}\,e^{-k^2\,\sqrt{d^{-k}\,q$$

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

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

$$\frac{9\,\,\dot{\mathbb{1}}\,\,e^{\,\left[-\frac{ArcSin\left[c\,x\right]}{i\,\,\sqrt{d}\,\,+\!\,\sqrt{e}\,\,x}\,-\,\frac{c\,\,log\left[\frac{2\,e\,\left[\sqrt{e}\,\,\pm\,i\,\,c^{2}\,\,\sqrt{d}\,\,x\,+\!\,\sqrt{c^{2}}\,d\,+e}{\sqrt{1\,-\,c^{2}}\,\,x^{2}}\right]}{\sqrt{c^{2}}\,d\,+e}\right]}{\sqrt{c^{2}}\,d\,+e}}\right]}{16\,\,d^{7/2}}\,-\,\frac{1}{16\,d^{3}}e^{3/2}\left[-\,\frac{c\,\,\sqrt{1\,-\,c^{2}}\,\,x^{2}}}{\left(\,c^{2}\,d\,+\,e\,\right)\,\,\left(\,\dot{\mathbb{1}}\,\,\sqrt{d}\,\,+\,\sqrt{e}\,\,x\,\right)}\,-\,\frac{1}{16\,d^{3}}e^{3/2}}\right]}$$

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

$$\frac{1}{16\,d^4}\,3\,e\,\left(i\,\left(\pi-2\,\text{ArcSin}\,[\,c\,\,x\,]\,\right)^2-32\,\,i\,\,\text{ArcSin}\,\left[\,\frac{\sqrt{1-\frac{i\,c\,\sqrt{d}}{\sqrt{e}}}}{\sqrt{2}}\,\right]$$

$$\label{eq:arcTan} \operatorname{ArcTan} \Big[\, \frac{ \left(c \, \sqrt{d} \, - \, \mathbb{i} \, \sqrt{e} \, \right) \, \operatorname{Cot} \left[\, \frac{1}{4} \, \left(\pi + 2 \, \operatorname{ArcSin} \left[\, c \, x \, \right] \, \right) \, \right]}{\sqrt{c^2 \, d + e}} \, \Big] \, - \\$$

$$4 \left(\pi + 4 \operatorname{ArcSin} \left[\frac{\sqrt{1 - \frac{i c \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] - 2 \operatorname{ArcSin} [c x] \right)$$

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

$$\mathbf{4}\,\left(\pi\,-\,\mathbf{2}\,\mathsf{ArcSin}\,[\,c\,\,x]\,\right)\,\mathsf{Log}\!\left[\,c\,\,\sqrt{\,d\,}\,\,+\,\mathbf{ii}\,\,c\,\,\sqrt{\,e\,}\,\,x\,\right]\,+\,\mathbf{8}\,\mathsf{ArcSin}\,[\,c\,\,x]\,\,\mathsf{Log}\!\left[\,c\,\,\sqrt{\,d\,}\,\,+\,\mathbf{ii}\,\,c\,\,\sqrt{\,e\,}\,\,x\,\right]\,+\,\mathbf{8}\,\mathsf{ArcSin}\,[\,c\,\,x]\,\,\mathsf{Log}\left[\,c\,\,\sqrt{\,d\,}\,\,+\,\mathbf{ii}\,\,c\,\,\sqrt{\,e\,}\,\,x\,\right]\,+\,\mathbf{8}\,\mathsf{ArcSin}\,[\,c\,\,x]\,\,\mathsf{Log}\left[\,c\,\,\sqrt{\,d\,}\,\,+\,\mathbf{ii}\,\,c\,\,\sqrt{\,e\,}\,\,x\,\right]\,+\,\mathbf{8}\,\mathsf{ArcSin}\,[\,c\,\,x]\,\,\mathsf{Log}\left[\,c\,\,\sqrt{\,d\,}\,\,+\,\mathbf{ii}\,\,c\,\,\sqrt{\,e\,}\,\,x\,\right]$$

$$8 \ i \ \left[PolyLog \left[2, \ \frac{\left(-c \ \sqrt{d} \ + \sqrt{c^2 \ d + e} \ \right) \ e^{-i \ ArcSin[c \ x]}}{\sqrt{e}} \right] + \right]$$

PolyLog[2,
$$-\frac{\left(c\sqrt{d} + \sqrt{c^2d + e}\right)e^{-i\operatorname{ArcSin}[cx]}}{\sqrt{e}}$$
]

$$\frac{1}{16\,\mathsf{d}^4}\,3\,\mathsf{e}\,\left[\,\dot{\mathbb{1}}\,\left(\pi\,-\,2\,\mathsf{ArcSin}\,[\,\mathsf{c}\,\,\mathsf{x}\,]\,\right)^{\,2}\,-\,32\,\,\dot{\mathbb{1}}\,\,\mathsf{ArcSin}\,\Big[\,\frac{\sqrt{\,1\,+\,\frac{\dot{\mathbb{1}}\,\mathsf{c}\,\sqrt{\,\mathsf{d}}\,\,}{\sqrt{\,\mathsf{e}}\,\,}}}{\sqrt{2}}\,\Big]\,$$

$$\label{eq:arcTan} \text{ArcTan} \Big[\, \frac{ \left(c \, \sqrt{d} \, + \, \text{$\dot{\text{$\sc in}$}$} \, \sqrt{e} \, \right) \, \text{Cot} \left[\, \frac{1}{4} \, \left(\pi + 2 \, \text{ArcSin} \left[\, c \, \, x \, \right] \, \right) \, \right]}{\sqrt{c^2 \, d + e}} \, \Big] \, - \\$$

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

$$4 \left[\pi + 4 \operatorname{ArcSin} \left[\frac{\sqrt{1 + \frac{\mathrm{i} \, c \, \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] - 2 \operatorname{ArcSin} \left[c \, x \right] \right]$$

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

$$4 \left(\pi - 2 \operatorname{ArcSin} \left[c \, x \right] \right) \operatorname{Log} \left[c \, \sqrt{d} - \mathrm{i} \, c \, \sqrt{e} \, x \right] + 8 \operatorname{ArcSin} \left[c \, x \right] \operatorname{Log} \left[c \, \sqrt{d} - \mathrm{i} \, c \, \sqrt{e} \, x \right] +$$

$$8 \, \mathrm{i} \left[\operatorname{PolyLog} \left[2, \frac{\left(c \, \sqrt{d} - \sqrt{c^2 \, d + e} \right) \, \mathrm{e}^{-\mathrm{i} \, ArcSin} \left[c \, x \right]}{\sqrt{e}} \right] \right] +$$

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

Problem 56: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 70 leaves, 6 steps):

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

Result (type 6, 164 leaves):

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

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

Problem 57: Result unnecessarily involves higher level functions.

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

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

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

Result (type 6, 231 leaves):

$$\begin{split} &\frac{1}{3\,d^2\,\left(d+e\,x^2\right)^{3/2}} \left(\frac{b\,c\,d\,\sqrt{1-c^2\,x^2}\,\left(d+e\,x^2\right)}{c^2\,d+e} + \\ &a\,x\,\left(3\,d+2\,e\,x^2\right) - \left(4\,b\,c\,d\,x^2\,\left(d+e\,x^2\right)\,\mathsf{AppellF1}\big[1,\,\frac{1}{2},\,\frac{1}{2},\,2,\,c^2\,x^2,\,-\frac{e\,x^2}{d}\big]\right) \right/ \\ &\left(\sqrt{1-c^2\,x^2}\,\left(4\,d\,\mathsf{AppellF1}\big[1,\,\frac{1}{2},\,\frac{1}{2},\,2,\,c^2\,x^2,\,-\frac{e\,x^2}{d}\big] + \right. \\ &\left. x^2\left(-e\,\mathsf{AppellF1}\big[2,\,\frac{1}{2},\,\frac{3}{2},\,3,\,c^2\,x^2,\,-\frac{e\,x^2}{d}\big] + c^2\,d\,\mathsf{AppellF1}\big[2,\,\frac{3}{2},\,\frac{1}{2},\,3,\,c^2\,x^2,\,-\frac{e\,x^2}{d}\big]\right)\right)\right) + \\ &b\,x\,\left(3\,d+2\,e\,x^2\right)\,\mathsf{ArcSin}\,[c\,x] \end{split}$$

Problem 58: Result unnecessarily involves higher level functions.

$$\int \frac{a + b \operatorname{ArcSin}[c x]}{\left(d + e x^2\right)^{7/2}} \, dx$$

Optimal (type 3, 226 leaves, 8 steps):

$$\begin{split} &\frac{b\,c\,\sqrt{1-c^2\,x^2}}{15\,d\,\left(c^2\,d+e\right)\,\left(d+e\,x^2\right)^{\,3/2}}\,+\,\frac{2\,b\,c\,\left(3\,c^2\,d+2\,e\right)\,\sqrt{1-c^2\,x^2}}{15\,d^2\,\left(c^2\,d+e\right)^{\,2}\,\sqrt{d+e\,x^2}}\,+\,\frac{x\,\left(a+b\,ArcSin\left[c\,x\right]\right)}{5\,d\,\left(d+e\,x^2\right)^{\,5/2}}\,+\,\\ &\frac{4\,x\,\left(a+b\,ArcSin\left[c\,x\right]\right)}{15\,d^2\,\left(d+e\,x^2\right)^{\,3/2}}\,+\,\frac{8\,x\,\left(a+b\,ArcSin\left[c\,x\right]\right)}{15\,d^3\,\sqrt{d+e\,x^2}}\,+\,\frac{8\,b\,ArcTan\left[\frac{\sqrt{e}\,\sqrt{1-c^2\,x^2}}{c\,\sqrt{d+e\,x^2}}\right]}{15\,d^3\,\sqrt{e}} \end{split}$$

Result (type 6, 304 leaves):

$$\begin{split} &\frac{1}{15\,d^3\,\left(d+e\,x^2\right)^{5/2}} \left(\frac{b\,c\,d^2\,\sqrt{1-c^2\,x^2}}{c^2\,d+e} + \frac{2\,b\,c\,d\,\left(3\,c^2\,d+2\,e\right)\,\sqrt{1-c^2\,x^2}}{\left(c^2\,d+e\right)^2} + \frac{2\,b\,c\,d\,\left(3\,c^2\,d+2\,e\right)\,\sqrt{1-c^2\,x^2}}{\left(c^2\,d+e\right)^2} + \\ &a\,x\,\left(15\,d^2+20\,d\,e\,x^2+8\,e^2\,x^4\right) - \left(16\,b\,c\,d\,x^2\,\left(d+e\,x^2\right)^2\,\mathsf{AppellF1}\left[1,\,\frac{1}{2},\,\frac{1}{2},\,2,\,c^2\,x^2,\,-\frac{e\,x^2}{d}\right]\right) \bigg/ \\ &\left(\sqrt{1-c^2\,x^2}\,\left(4\,d\,\mathsf{AppellF1}\left[1,\,\frac{1}{2},\,\frac{1}{2},\,2,\,c^2\,x^2,\,-\frac{e\,x^2}{d}\right] + \right. \\ &\left. x^2\,\left(-\,e\,\mathsf{AppellF1}\left[2,\,\frac{1}{2},\,\frac{3}{2},\,3,\,c^2\,x^2,\,-\frac{e\,x^2}{d}\right] + c^2\,d\,\mathsf{AppellF1}\left[2,\,\frac{3}{2},\,\frac{1}{2},\,3,\,c^2\,x^2,\,-\frac{e\,x^2}{d}\right]\right)\right) \right) + \\ &b\,x\,\left(15\,d^2+20\,d\,e\,x^2+8\,e^2\,x^4\right)\,\mathsf{ArcSin}\left[c\,x\right] \bigg) \end{split}$$

Problem 68: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 821 leaves, 22 steps):

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

Result (type 4, 3335 leaves):

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

$$\left[\pi + 4 \operatorname{ArcSin} \left[\frac{\sqrt{1 - \frac{1 + \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \right]$$

$$\log \left[\frac{e^{-i \operatorname{ArcSin} \left(e \, x \right)} \left(e \, \sqrt{d} - \sqrt{e^2 \, d + e} + \sqrt{e} \, e^{i \operatorname{ArcSin} \left(e \, x \right)} \right)}{\sqrt{e}} \right] - \left[\pi + 4 \operatorname{ArcSin} \left[\frac{\sqrt{1 + \frac{1 + \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \right]$$

$$\log \left[\frac{e^{-i \operatorname{ArcSin} \left(e \, x \right)} \left(-e \, \sqrt{d} + \sqrt{e^2 \, d + e} + \sqrt{e} \, e^{i \operatorname{ArcSin} \left(e \, x \right)} \right)}{\sqrt{e}} \right] + \left[\pi - 4 \operatorname{ArcSin} \left[\frac{\sqrt{1 - \frac{1 + \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \right]$$

$$\log \left[\frac{e^{-i \operatorname{ArcSin} \left(e \, x \right)} \left(e \, \sqrt{d} + \sqrt{e^2 \, d + e} + \sqrt{e} \, e^{i \operatorname{ArcSin} \left(e \, x \right)} \right)}{\sqrt{e}} \right] + \left[\pi - 2 \operatorname{ArcSin} \left(e \, x \right) \right] \operatorname{Log} \left[e \, \left(\sqrt{d} - i \, \sqrt{e} \, x \right) \right] + 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} - i \, \sqrt{e} \, x \right) \right] - \left[\pi - 2 \operatorname{ArcSin} \left(e \, x \right) \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[e \, x \right] \operatorname{Log} \left[e \, \left(\sqrt{d} + i \, \sqrt{e} \, x \right) \right] - 2 \operatorname{ArcSin} \left[$$

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

$$\begin{split} & \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \, \Big(c \, \sqrt{d} - \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] + \\ & \text{ArcSin} \Big[\frac{\sqrt{1 - \frac{1 \, c \, \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \Big] \, \text{ArcSin} (c \, x) \, \text{Log} \Big[\frac{1}{\sqrt{e}} \\ & \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \, \Big(c \, \sqrt{d} - \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \text{ArcSin} [c \, x]^2 \, \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \pi \, \text{ArcSin} [c \, x] \\ & \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \, \Big(- c \, \sqrt{d} + \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \pi \, \text{ArcSin} [c \, x] \\ & \text{ArcSin} \Big[\frac{\sqrt{1 + \frac{1 \, c \, \sqrt{d}}{\sqrt{e}}}}{\sqrt{2}} \Big] \, \text{ArcSin} [c \, x] \, \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \Big] + \pi \, \text{ArcSin} [c \, x] \\ & \text{Cov} \Big[- c \, \sqrt{d} + \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] + \pi \, \text{ArcSin} [c \, x] \\ & \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \Big[c \, \sqrt{d} + \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \pi \, \text{ArcSin} [c \, x] \\ & \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \Big[c \, \sqrt{d} + \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \pi \, \text{ArcSin} [c \, x] \\ & \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \Big[c \, \sqrt{d} + \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \pi \, \text{ArcSin} [c \, x] \\ & \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \Big[c \, \sqrt{d} + \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \pi \, \text{ArcSin} [c \, x] \\ & \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \Big[c \, \sqrt{d} + \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \pi \, \text{ArcSin} [c \, x] \\ & \text{Log} \Big[\frac{1}{\sqrt{e}} \Big(- \mathrm{i} \, c \, x + \sqrt{1 - c^2 \, x^2} \, \Big) \Big[c \, \sqrt{d} + \sqrt{c^2 \, d + e} + \mathrm{i} \, c \, \sqrt{e} \, x + \sqrt{e} \, \sqrt{1 - c^2 \, x^2} \, \Big) \Big] - \pi \, \text{ArcSin} [c \, x] \\ & \text$$

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

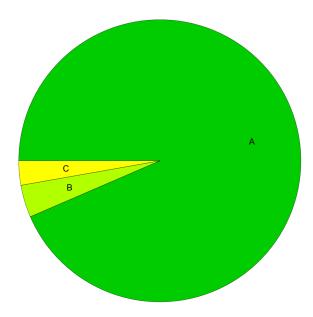
$$2 \text{ i ArcSin} [c \text{ x}] \text{ PolyLog} \Big[2 \text{, } \frac{\sqrt{e} \ e^{\text{i ArcSin}[c \text{ x}]}}{c \sqrt{d} \ + \sqrt{c^2 \ d + e}} \Big] \ -$$

$$2 \, \text{PolyLog} \Big[3 \text{, } \frac{\sqrt{e} \, \, e^{\text{i} \, \text{ArcSin}[c \, x]}}{c \, \sqrt{d} \, - \sqrt{c^2 \, d + e}} \Big] \, + \, 2 \, \text{PolyLog} \Big[3 \text{, } \frac{\sqrt{e} \, \, e^{\text{i} \, \text{ArcSin}[c \, x]}}{-c \, \sqrt{d} \, + \sqrt{c^2 \, d + e}} \Big] \, + \, \frac{1}{c} \, \left[\frac{1}{c} \, \left(\frac{1}{c} \, \frac{1}{c} \, \left(\frac{1}{c} \, \frac{1}{c$$

$$2 \, \text{PolyLog} \Big[3 \text{, } -\frac{\sqrt{e} \, \, e^{\text{i} \, \text{ArcSin}[c \, x]}}{c \, \sqrt{d} \, + \sqrt{c^2 \, d + e}} \Big] \, - \, 2 \, \text{PolyLog} \Big[3 \text{, } \frac{\sqrt{e} \, \, e^{\text{i} \, \text{ArcSin}[c \, x]}}{c \, \sqrt{d} \, + \sqrt{c^2 \, d + e}} \Big] \Bigg] \Bigg]$$

Summary of Integration Test Results

108 integration problems



- A 101 optimal antiderivatives
- B 4 more than twice size of optimal antiderivatives
- C 3 unnecessarily complex antiderivatives
- D 0 unable to integrate problems
- E 0 integration timeouts