Mathematica 11.3 Integration Test Results

Test results for the 357 problems in "4.1.12 (e x)^m (a+b sin(c+d x^n))^p.m"

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

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

Optimal (type 4, 245 leaves, 9 steps):

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

Result (type 4, 952 leaves):

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

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

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

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

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

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

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

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

$$\left(\text{ArcCos}\left[-\frac{a}{b}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^2\right)\right]}{\sqrt{-a^2+b^2}}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Tan}\left[\frac{1}{4}\left(2c+\pi+2dx^2\right)\right]}{\sqrt{-a^2+b^2}}\right]\right)\text{Log}\left[\frac{\sqrt{-a^2+b^2}\,e^{\frac{1}{4}i\left(2c-\pi+2dx^2\right)}}{\sqrt{2}\,\sqrt{b}\,\sqrt{a+b\,\text{Sin}\left[c+dx^2\right]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{a}{b}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^2\right)\right]}{\sqrt{-a^2+b^2}}\right]\right)$$

$$\text{Log}\left[1+\left(i\left(i\,a+\sqrt{-a^2+b^2}\right)\left(a+b+\sqrt{-a^2+b^2}\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^2\right)\right]\right)\right)\Big/\left(b\left(a+b+\sqrt{-a^2+b^2}\,\text{Cot}\left[\frac{1}{4}\left(2c+\pi+2dx^2\right)\right]\right)\right)\right]+$$

$$i\left(\text{PolyLog}\left[2,\left(\left(a-i\sqrt{-a^2+b^2}\right)\left(a+b+\sqrt{-a^2+b^2}\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^2\right)\right]\right)\right)\Big/\left(b\left(a+b+\sqrt{-a^2+b^2}\,\text{Cot}\left[\frac{1}{4}\left(2c+\pi+2dx^2\right)\right]\right)\right)\right]-\right.$$

$$\left.\text{PolyLog}\left[2,\left(\left(a+i\sqrt{-a^2+b^2}\right)\left(a+b+\sqrt{-a^2+b^2}\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^2\right)\right]\right)\right)\Big/\left(b\left(a+b+\sqrt{-a^2+b^2}\,\text{Cot}\left[\frac{1}{4}\left(2c+\pi+2dx^2\right)\right]\right)\right)\right]\right)\right)$$

Problem 81: Result more than twice size of optimal antiderivative.

$$\int\frac{x^5}{a+b\,\text{Sin}\left[c+dx^3\right]}\,dx$$

Optimal (type 4, 245 leaves, 9 steps):

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

Result (type 4, 952 leaves):

$$\frac{1}{3d^2}\left(\frac{\pi\,\text{ArcTan}\left[\frac{b+a\,\text{Tan}\left[\frac{1}{2}\left(c+dx^3\right)\right]}{\sqrt{a^2-b^2}}\right]}{\sqrt{a^2-b^2}}+\right.$$

$$\frac{1}{\sqrt{-a^2+b^2}}\left(2\left(c-\text{ArcCos}\left[-\frac{a}{b}\right]\right)\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^3\right)\right]}{\sqrt{-a^2+b^2}}\right]+\right.$$

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

$$\left(\text{ArcCos}\left[-\frac{a}{b}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^3\right)\right]}{\sqrt{-a^2+b^2}}\right]\right)$$

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

$$\left(\text{ArcCos}\left[-\frac{a}{b}\right]+2\,i\left(-\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^3\right)\right]}{\sqrt{-a^2+b^2}}\right]+\text{ArcTanh}\left[\frac{(a+b)\,\text{Tan}\left[\frac{1}{4}\left(2c+\pi+2dx^3\right)\right]}{\sqrt{-a^2+b^2}}\right]\right)\right)\text{Log}\left[\frac{\sqrt{-a^2+b^2}\,e^{\frac{1}{4}i\left(-2c+\pi-2dx^3\right)}}{\sqrt{2}\sqrt{b}\sqrt{a+b\,\text{Sin}\left[c+dx^3\right]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{a}{b}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^3\right)\right]}{\sqrt{-a^2+b^2}}\right]-2\,i\,\text{ArcTanh}\left[\frac{(a+b)\,\text{Tan}\left[\frac{1}{4}\left(2c+\pi+2dx^3\right)\right]}{\sqrt{-a^2+b^2}}\right]\right)\text{Log}\left[\frac{\sqrt{-a^2+b^2}\,e^{\frac{1}{4}i\left(2c-\pi+2dx^3\right)}}{\sqrt{2}\sqrt{b}\sqrt{a+b\,\text{Sin}\left[c+dx^3\right]}}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{a}{b}\right]+2\,i\,\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^3\right)\right]}{\sqrt{-a^2+b^2}}\right]\right)$$

$$\text{Log}\left[1+\left(i\left(i\,a+\sqrt{-a^2+b^2}\right)\left(a+b+\sqrt{-a^2+b^2}\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^3\right)\right]\right)\right)\Big/\left(b\left(a+b+\sqrt{-a^2+b^2}\,\text{Cot}\left[\frac{1}{4}\left(2c+\pi+2dx^3\right)\right]\right)\right)\right]+$$

$$i\left(\text{PolyLog}\left[2,\left(\left(a-i\sqrt{-a^2+b^2}\right)\left(a+b+\sqrt{-a^2+b^2}\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^3\right)\right]\right)\right)\Big/\left(b\left(a+b+\sqrt{-a^2+b^2}\,\text{Cot}\left[\frac{1}{4}\left(2c+\pi+2dx^3\right)\right]\right)\right)\right]-\right.$$

$$\left.\text{PolyLog}\left[2,\left(\left(a+i\sqrt{-a^2+b^2}\right)\left(a+b+\sqrt{-a^2+b^2}\,\text{Tan}\left[\frac{1}{4}\left(2c-\pi+2dx^3\right)\right]\right)\right)\Big/\left(b\left(a+b+\sqrt{-a^2+b^2}\,\text{Cot}\left[\frac{1}{4}\left(2c+\pi+2dx^3\right)\right]\right)\right)\right]\right)\Bigg)\Bigg)$$

Problem 165: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 341 leaves, 14 steps):

$$-\frac{3 f (d e-c f)^2 \operatorname{Cos}\left[a+b (c+d x)^2\right]}{2 b d^4}-\frac{3 f^2 (d e-c f) (c+d x) \operatorname{Cos}\left[a+b (c+d x)^2\right]}{2 b d^4}-\frac{f^3 (c+d x)^2 \operatorname{Cos}\left[a+b (c+d x)^2\right]}{2 b d^4}+\frac{3 f^2 (d e-c f) \sqrt{\frac{\pi}{2}} \operatorname{Cos}[a] \operatorname{FresnelC}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c+d x)\right]}{2 b^{3/2} d^4}+\frac{(d e-c f)^3 \sqrt{\frac{\pi}{2}} \operatorname{Cos}[a] \operatorname{FresnelS}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c+d x)\right]}{\sqrt{b} d^4}+\frac{(d e-c f)^3 \sqrt{\frac{\pi}{2}} \operatorname{FresnelC}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c+d x)\right] \operatorname{Sin}[a]}{\sqrt{b} d^4}-\frac{3 f^2 (d e-c f) \sqrt{\frac{\pi}{2}} \operatorname{FresnelS}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c+d x)\right] \operatorname{Sin}[a]}{2 b^{3/2} d^4}+\frac{f^3 \operatorname{Sin}\left[a+b (c+d x)^2\right]}{2 b^2 d^4}$$

Result (type 4, 283 leaves):

$$-\frac{1}{2 \sqrt{2} b^2 d^4}\left(\operatorname{Cos}\left[a+b (c+d x)^2\right]-i \operatorname{Sin}\left[a+b (c+d x)^2\right]\right)\left(\operatorname{Cos}\left[a+b (c+d x)^2\right]+i \operatorname{Sin}\left[a+b (c+d x)^2\right]\right)\left(-\sqrt{b} (d e-c f) \sqrt{\pi} \operatorname{FresnelS}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c+d x)\right]\left(2 b (d e-c f)^2 \operatorname{Cos}[a]-3 f^2 \operatorname{Sin}[a]\right)-\sqrt{b} (d e-c f) \sqrt{\pi} \operatorname{FresnelC}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c+d x)\right]\left(3 f^2 \operatorname{Cos}[a]+2 b (d e-c f)^2 \operatorname{Sin}[a]\right)+\sqrt{2} f\left(b\left(c^2 f^2-c d f (3 e+f x)+d^2\left(3 e^2+3 e f x+f^2 x^2\right)\right) \operatorname{Cos}\left[a+b (c+d x)^2\right]-f^2 \operatorname{Sin}\left[a+b (c+d x)^2\right]\right)\right)$$

Problem 171: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 434 leaves, 14 steps):

$$-\frac{f^2 (d e-c f) \operatorname{Cos}\left[a+b (c+d x)^3\right]}{b d^4}-\frac{f^3 (c+d x) \operatorname{Cos}\left[a+b (c+d x)^3\right]}{3 b d^4}-\frac{e^{i a} f^3 (c+d x) \operatorname{Gamma}\left[\frac{1}{3},-i b (c+d x)^3\right]}{18 b d^4 \left(-i b (c+d x)^3\right)^{1/3}}+\frac{i e^{i a} (d e-c f)^3 (c+d x) \operatorname{Gamma}\left[\frac{1}{3},-i b (c+d x)^3\right]}{6 d^4 \left(-i b (c+d x)^3\right)^{1/3}}-\frac{e^{-i a} f^3 (c+d x) \operatorname{Gamma}\left[\frac{1}{3},i b (c+d x)^3\right]}{18 b d^4 \left(i b (c+d x)^3\right)^{1/3}}-\frac{i e^{-i a} (d e-c f)^3 (c+d x) \operatorname{Gamma}\left[\frac{1}{3},i b (c+d x)^3\right]}{6 d^4 \left(i b (c+d x)^3\right)^{1/3}}+\frac{i e^{i a} f (d e-c f)^2 (c+d x)^2 \operatorname{Gamma}\left[\frac{2}{3},-i b (c+d x)^3\right]}{2 d^4 \left(-i b (c+d x)^3\right)^{2/3}}-\frac{i e^{-i a} f (d e-c f)^2 (c+d x)^2 \operatorname{Gamma}\left[\frac{2}{3},i b (c+d x)^3\right]}{2 d^4 \left(i b (c+d x)^3\right)^{2/3}}$$

Result (type 1, 1 leaves):

???

Problem 172: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 280 leaves, 10 steps):

$$-\frac{f^2 \operatorname{Cos}\left[a+b (c+d x)^3\right]}{3 b d^3}+\frac{i e^{i a} (d e-c f)^2 (c+d x) \operatorname{Gamma}\left[\frac{1}{3},-i b (c+d x)^3\right]}{6 d^3 \left(-i b (c+d x)^3\right)^{1/3}}-\frac{i e^{-i a} (d e-c f)^2 (c+d x) \operatorname{Gamma}\left[\frac{1}{3},i b (c+d x)^3\right]}{6 d^3 \left(i b (c+d x)^3\right)^{1/3}}+\frac{i e^{i a} f (d e-c f) (c+d x)^2 \operatorname{Gamma}\left[\frac{2}{3},-i b (c+d x)^3\right]}{3 d^3 \left(-i b (c+d x)^3\right)^{2/3}}-\frac{i e^{-i a} f (d e-c f) (c+d x)^2 \operatorname{Gamma}\left[\frac{2}{3},i b (c+d x)^3\right]}{3 d^3 \left(i b (c+d x)^3\right)^{2/3}}$$

Result (type 1, 1 leaves):

???

Problem 173: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 235 leaves, 8 steps):

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

Result (type 1, 1 leaves):

???

Problem 175: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 23 leaves, 0 steps):

$$\text{Int}\left[\frac{\text{Sin}\left[a + b (c + d x)^3\right]}{e + f x}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 176: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 23 leaves, 0 steps):

$$\text{Int}\left[\frac{\text{Sin}\left[a + b (c + d x)^3\right]}{(e + f x)^2}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 183: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 235 leaves, 8 steps):

$$-\frac{\mathrm{i}\, e^{\mathrm{i} a} f \left(-\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2 \,\text{Gamma}\left[-\frac{2}{3},-\frac{\mathrm{i} b}{(c+d x)^3}\right]}{6 d^2}+\frac{\mathrm{i}\, e^{-\mathrm{i} a} f \left(\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2 \,\text{Gamma}\left[-\frac{2}{3},\frac{\mathrm{i} b}{(c+d x)^3}\right]}{6 d^2}-\frac{\mathrm{i}\, e^{\mathrm{i} a} (d e-c f) \left(-\frac{\mathrm{i} b}{(c+d x)^3}\right)^{1/3} (c+d x) \,\text{Gamma}\left[-\frac{1}{3},-\frac{\mathrm{i} b}{(c+d x)^3}\right]}{6 d^2}+\frac{\mathrm{i}\, e^{-\mathrm{i} a} (d e-c f) \left(\frac{\mathrm{i} b}{(c+d x)^3}\right)^{1/3} (c+d x) \,\text{Gamma}\left[-\frac{1}{3},\frac{\mathrm{i} b}{(c+d x)^3}\right]}{6 d^2}$$

Result (type 4, 700 leaves):

$$\frac{e (c+d x) \,\text{Cos}\left[\frac{b}{(c+d x)^3}\right] \text{Sin}[a]}{d}+\frac{f (-c+d x) (c+d x) \,\text{Cos}\left[\frac{b}{(c+d x)^3}\right] \text{Sin}[a]}{2 d^2}+$$
$$\frac{1}{2 d^2} 3 b f \left(\frac{1}{2} \text{Cos}[a] \left(\frac{\text{Gamma}\left[\frac{1}{3},-\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(-\frac{\mathrm{i} b}{(c+d x)^3}\right)^{1/3} (c+d x)}+\frac{\text{Gamma}\left[\frac{1}{3},\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(\frac{\mathrm{i} b}{(c+d x)^3}\right)^{1/3} (c+d x)}\right)+\right.$$
$$\left.\frac{1}{2} \mathrm{i} \left(\frac{\text{Gamma}\left[\frac{1}{3},-\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(-\frac{\mathrm{i} b}{(c+d x)^3}\right)^{1/3} (c+d x)}-\frac{\text{Gamma}\left[\frac{1}{3},\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(\frac{\mathrm{i} b}{(c+d x)^3}\right)^{1/3} (c+d x)}\right) \text{Sin}[a]\right)+$$
$$\frac{1}{d} 3 b e \left(\frac{1}{2} \text{Cos}[a] \left(\frac{\text{Gamma}\left[\frac{2}{3},-\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(-\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2}+\frac{\text{Gamma}\left[\frac{2}{3},\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2}\right)+\right.$$
$$\left.\frac{1}{2} \mathrm{i} \left(\frac{\text{Gamma}\left[\frac{2}{3},-\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(-\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2}-\frac{\text{Gamma}\left[\frac{2}{3},\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2}\right) \text{Sin}[a]\right)-$$
$$\frac{1}{d^2} 3 b c f \left(\frac{1}{2} \text{Cos}[a] \left(\frac{\text{Gamma}\left[\frac{2}{3},-\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(-\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2}+\frac{\text{Gamma}\left[\frac{2}{3},\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2}\right)+\right.$$
$$\left.\frac{1}{2} \mathrm{i} \left(\frac{\text{Gamma}\left[\frac{2}{3},-\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(-\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2}-\frac{\text{Gamma}\left[\frac{2}{3},\frac{\mathrm{i} b}{(c+d x)^3}\right]}{3 \left(\frac{\mathrm{i} b}{(c+d x)^3}\right)^{2/3} (c+d x)^2}\right) \text{Sin}[a]\right)+$$
$$\frac{e (c+d x) \,\text{Cos}[a] \,\text{Sin}\left[\frac{b}{(c+d x)^3}\right]}{d}+\frac{f (-c+d x) (c+d x) \,\text{Cos}[a] \,\text{Sin}\left[\frac{b}{(c+d x)^3}\right]}{2 d^2}$$

Problem 190: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 238 leaves, 8 steps):

$$\frac{\text{CosIntegral}\left[\frac{b\sqrt{-d e+c f}}{\sqrt{f}}+b\sqrt{c+d x}\right]\text{Sin}\left[a-\frac{b\sqrt{-d e+c f}}{\sqrt{f}}\right]}{f}+\frac{\text{CosIntegral}\left[\frac{b\sqrt{-d e+c f}}{\sqrt{f}}-b\sqrt{c+d x}\right]\text{Sin}\left[a+\frac{b\sqrt{-d e+c f}}{\sqrt{f}}\right]}{f}-\frac{\text{Cos}\left[a+\frac{b\sqrt{-d e+c f}}{\sqrt{f}}\right]\text{SinIntegral}\left[\frac{b\sqrt{-d e+c f}}{\sqrt{f}}-b\sqrt{c+d x}\right]}{f}+\frac{\text{Cos}\left[a-\frac{b\sqrt{-d e+c f}}{\sqrt{f}}\right]\text{SinIntegral}\left[\frac{b\sqrt{-d e+c f}}{\sqrt{f}}+b\sqrt{c+d x}\right]}{f}$$

Result (type 4, 238 leaves) :

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

Problem 191: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 339 leaves, 10 steps) :

$$\frac{b d\,\text{Cos}\left[a+\frac{b\sqrt{-d e+c f}}{\sqrt{f}}\right]\text{CosIntegral}\left[\frac{b\sqrt{-d e+c f}}{\sqrt{f}}-b\sqrt{c+d x}\right]}{2 f^{3/2}\sqrt{-d e+c f}}-\frac{b d\,\text{Cos}\left[a-\frac{b\sqrt{-d e+c f}}{\sqrt{f}}\right]\text{CosIntegral}\left[\frac{b\sqrt{-d e+c f}}{\sqrt{f}}+b\sqrt{c+d x}\right]}{2 f^{3/2}\sqrt{-d e+c f}}-\frac{\text{Sin}\left[a+b\sqrt{c+d x}\right]}{f(e+f x)}+\frac{b d\,\text{Sin}\left[a+\frac{b\sqrt{-d e+c f}}{\sqrt{f}}\right]\text{SinIntegral}\left[\frac{b\sqrt{-d e+c f}}{\sqrt{f}}-b\sqrt{c+d x}\right]}{2 f^{3/2}\sqrt{-d e+c f}}+\frac{b d\,\text{Sin}\left[a-\frac{b\sqrt{-d e+c f}}{\sqrt{f}}\right]\text{SinIntegral}\left[\frac{b\sqrt{-d e+c f}}{\sqrt{f}}+b\sqrt{c+d x}\right]}{2 f^{3/2}\sqrt{-d e+c f}}$$

Result (type 4, 397 leaves) :

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

Problem 193: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 291 leaves, 9 steps):

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

Result (type 4, 705 leaves):

$$-\frac{2 f \sqrt{c+d x} \operatorname{Cos}[a] \operatorname{Cos}\left[b (c+d x)^{3/2}\right]}{3 b d^2}+$$

$$\frac{f \operatorname{Cos}[a]\left(-\frac{2 \sqrt{c+d x} \operatorname{Gamma}\left[\frac{1}{3},-i b (c+d x)^{3/2}\right]}{3\left(-i b (c+d x)^{3/2}\right)^{1/3}}-\frac{2 \sqrt{c+d x} \operatorname{Gamma}\left[\frac{1}{3}, i b (c+d x)^{3/2}\right]}{3\left(i b (c+d x)^{3/2}\right)^{1/3}}\right)}{6 b d^2}-$$

$$\frac{i e \operatorname{Cos}[a]\left(-\frac{2 (c+d x) \operatorname{Gamma}\left[\frac{2}{3},-i b (c+d x)^{3/2}\right]}{3\left(-i b (c+d x)^{3/2}\right)^{2/3}}+\frac{2 (c+d x) \operatorname{Gamma}\left[\frac{2}{3}, i b (c+d x)^{3/2}\right]}{3\left(i b (c+d x)^{3/2}\right)^{2/3}}\right)}{2 d}+$$

$$\frac{i c f \operatorname{Cos}[a]\left(-\frac{2 (c+d x) \operatorname{Gamma}\left[\frac{2}{3},-i b (c+d x)^{3/2}\right]}{3\left(-i b (c+d x)^{3/2}\right)^{2/3}}+\frac{2 (c+d x) \operatorname{Gamma}\left[\frac{2}{3}, i b (c+d x)^{3/2}\right]}{3\left(i b (c+d x)^{3/2}\right)^{2/3}}\right)}{2 d^2}+$$

$$\frac{i f\left(-\frac{2 \sqrt{c+d x} \operatorname{Gamma}\left[\frac{1}{3},-i b (c+d x)^{3/2}\right]}{3\left(-i b (c+d x)^{3/2}\right)^{1/3}}+\frac{2 \sqrt{c+d x} \operatorname{Gamma}\left[\frac{1}{3}, i b (c+d x)^{3/2}\right]}{3\left(i b (c+d x)^{3/2}\right)^{1/3}}\right) \operatorname{Sin}[a]}{6 b d^2}+$$

$$\frac{e\left(-\frac{2 (c+d x) \operatorname{Gamma}\left[\frac{2}{3},-i b (c+d x)^{3/2}\right]}{3\left(-i b (c+d x)^{3/2}\right)^{2/3}}-\frac{2 (c+d x) \operatorname{Gamma}\left[\frac{2}{3}, i b (c+d x)^{3/2}\right]}{3\left(i b (c+d x)^{3/2}\right)^{2/3}}\right) \operatorname{Sin}[a]}{2 d}-$$

$$\frac{c f\left(-\frac{2 (c+d x) \operatorname{Gamma}\left[\frac{2}{3},-i b (c+d x)^{3/2}\right]}{3\left(-i b (c+d x)^{3/2}\right)^{2/3}}-\frac{2 (c+d x) \operatorname{Gamma}\left[\frac{2}{3}, i b (c+d x)^{3/2}\right]}{3\left(i b (c+d x)^{3/2}\right)^{2/3}}\right) \operatorname{Sin}[a]}{2 d^2}+$$

$$\frac{2 f \sqrt{c+d x} \operatorname{Sin}[a] \operatorname{Sin}\left[b (c+d x)^{3/2}\right]}{3 b d^2}$$

Problem 197: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 611 leaves, 23 steps):

$$\frac{b^5 f^2 \sqrt{c+d x} \operatorname{Cos}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{360 d^3}-\frac{b^3 f (d e-c f) \sqrt{c+d x} \operatorname{Cos}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{6 d^3}+$$
$$\frac{b (d e-c f)^2 \sqrt{c+d x} \operatorname{Cos}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{d^3}-\frac{b^3 f^2 (c+d x)^{3/2} \operatorname{Cos}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{180 d^3}+$$
$$\frac{b f (d e-c f) (c+d x)^{3/2} \operatorname{Cos}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{3 d^3}+\frac{b f^2 (c+d x)^{5/2} \operatorname{Cos}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{15 d^3}+$$
$$\frac{b^6 f^2 \operatorname{CosIntegral}\left[\frac{b}{\sqrt{c+d x}}\right] \operatorname{Sin}[a]}{360 d^3}-\frac{b^4 f (d e-c f) \operatorname{CosIntegral}\left[\frac{b}{\sqrt{c+d x}}\right] \operatorname{Sin}[a]}{6 d^3}+$$
$$\frac{b^2 (d e-c f)^2 \operatorname{CosIntegral}\left[\frac{b}{\sqrt{c+d x}}\right] \operatorname{Sin}[a]}{d^3}+\frac{b^4 f^2 (c+d x) \operatorname{Sin}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{360 d^3}-$$
$$\frac{b^2 f (d e-c f) (c+d x) \operatorname{Sin}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{6 d^3}+\frac{(d e-c f)^2 (c+d x) \operatorname{Sin}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{d^3}-$$
$$\frac{b^2 f^2 (c+d x)^2 \operatorname{Sin}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{60 d^3}+\frac{f (d e-c f) (c+d x)^2 \operatorname{Sin}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{d^3}+$$
$$\frac{f^2 (c+d x)^3 \operatorname{Sin}\left[a+\frac{b}{\sqrt{c+d x}}\right]}{3 d^3}+\frac{b^6 f^2 \operatorname{Cos}[a] \operatorname{SinIntegral}\left[\frac{b}{\sqrt{c+d x}}\right]}{360 d^3}-$$
$$\frac{b^4 f (d e-c f) \operatorname{Cos}[a] \operatorname{SinIntegral}\left[\frac{b}{\sqrt{c+d x}}\right]}{6 d^3}+\frac{b^2 (d e-c f)^2 \operatorname{Cos}[a] \operatorname{SinIntegral}\left[\frac{b}{\sqrt{c+d x}}\right]}{d^3}$$

Result (type 4, 557 leaves):

$$\frac{1}{720 d^3} i e^{-i a} \left(e^{-\frac{i b}{\sqrt{c+d x}}} \sqrt{c+d x} \left(-i b^5 f^2+b^4 f^2 \sqrt{c+d x}+2 i b^3 f (30 d e-29 c f+d f x)-6 b^2 f \sqrt{c+d x} \right.\right.$$
$$(10 d e-9 c f+d f x)+120 \sqrt{c+d x} \left(c^2 f^2-c d f (3 e+f x)+d^2 \left(3 e^2+3 e f x+f^2 x^2\right)\right)-$$
$$\left.24 i b \left(11 c^2 f^2-c d f (25 e+3 f x)+d^2 \left(15 e^2+5 e f x+f^2 x^2\right)\right)\right)-e^{i \left(2 a+\frac{b}{\sqrt{c+d x}}\right)} \sqrt{c+d x}$$
$$\left(i b^5 f^2+b^4 f^2 \sqrt{c+d x}-2 i b^3 f (30 d e-29 c f+d f x)-6 b^2 f \sqrt{c+d x} (10 d e-9 c f+d f x)+\right.$$
$$120 \sqrt{c+d x} \left(c^2 f^2-c d f (3 e+f x)+d^2 \left(3 e^2+3 e f x+f^2 x^2\right)\right)+$$
$$\left.24 i b \left(11 c^2 f^2-c d f (25 e+3 f x)+d^2 \left(15 e^2+5 e f x+f^2 x^2\right)\right)\right)+$$
$$b^2 \left(360 d^2 e^2-60 \left(b^2+12 c\right) d e f+\left(b^4+60 b^2 c+360 c^2\right) f^2\right) \operatorname{ExpIntegralEi}\left[-\frac{i b}{\sqrt{c+d x}}\right]-$$
$$\left.b^2 e^{2 i a} \left(360 d^2 e^2-60 \left(b^2+12 c\right) d e f+\left(b^4+60 b^2 c+360 c^2\right) f^2\right) \operatorname{ExpIntegralEi}\left[\frac{i b}{\sqrt{c+d x}}\right]\right)$$

Problem 200: Unable to integrate problem.

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

Optimal (type 4, 276 leaves, 13 steps):

$$-\frac{2\,\text{CosIntegral}\left[\frac{b}{\sqrt{c+d\,x}}\right]\,\text{Sin}[a]}{f}+\frac{\text{CosIntegral}\left[\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}+\frac{b}{\sqrt{c+d\,x}}\right]\,\text{Sin}\left[a-\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}\right]}{f}+\frac{\text{CosIntegral}\left[\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}-\frac{b}{\sqrt{c+d\,x}}\right]\,\text{Sin}\left[a+\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}\right]}{f}-\frac{2\,\text{Cos}[a]\,\text{SinIntegral}\left[\frac{b}{\sqrt{c+d\,x}}\right]}{f}-\frac{\text{Cos}\left[a+\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}\right]\,\text{SinIntegral}\left[\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}-\frac{b}{\sqrt{c+d\,x}}\right]}{f}+\frac{\text{Cos}\left[a-\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}\right]\,\text{SinIntegral}\left[\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}+\frac{b}{\sqrt{c+d\,x}}\right]}{f}$$

Result (type 8, 24 leaves):

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

Problem 201: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 350 leaves, 10 steps):

$$-\frac{b\,d\,\text{Cos}\left[a+\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}\right]\,\text{CosIntegral}\left[\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}-\frac{b}{\sqrt{c+d\,x}}\right]}{2\sqrt{f}\,(-d\,e+c\,f)^{3/2}}+\frac{b\,d\,\text{Cos}\left[a-\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}\right]\,\text{CosIntegral}\left[\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}+\frac{b}{\sqrt{c+d\,x}}\right]}{2\sqrt{f}\,(-d\,e+c\,f)^{3/2}}+\frac{(c+d\,x)\,\text{Sin}\left[a+\frac{b}{\sqrt{c+d\,x}}\right]}{(d\,e-c\,f)\,(e+f\,x)}-\frac{b\,d\,\text{Sin}\left[a+\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}\right]\,\text{SinIntegral}\left[\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}-\frac{b}{\sqrt{c+d\,x}}\right]}{2\sqrt{f}\,(-d\,e+c\,f)^{3/2}}-\frac{b\,d\,\text{Sin}\left[a-\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}\right]\,\text{SinIntegral}\left[\frac{b\sqrt{f}}{\sqrt{-d\,e+c\,f}}+\frac{b}{\sqrt{c+d\,x}}\right]}{2\sqrt{f}\,(-d\,e+c\,f)^{3/2}}$$

Result (type 1, 1 leaves):

???

Problem 203: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 251 leaves, 8 steps):

$$-\frac{i e^{i a} f \left(-\frac{i b}{(c+d x)^{3/2}}\right)^{4/3} (c+d x)^2 \operatorname{Gamma}\left[-\frac{4}{3},-\frac{i b}{(c+d x)^{3/2}}\right]}{3 d^2}+\frac{i e^{-i a} f \left(\frac{i b}{(c+d x)^{3/2}}\right)^{4/3} (c+d x)^2 \operatorname{Gamma}\left[-\frac{4}{3},\frac{i b}{(c+d x)^{3/2}}\right]}{3 d^2}-\frac{i e^{i a} (d e-c f) \left(-\frac{i b}{(c+d x)^{3/2}}\right)^{2/3} (c+d x) \operatorname{Gamma}\left[-\frac{2}{3},-\frac{i b}{(c+d x)^{3/2}}\right]}{3 d^2}+\frac{i e^{-i a} (d e-c f) \left(\frac{i b}{(c+d x)^{3/2}}\right)^{2/3} (c+d x) \operatorname{Gamma}\left[-\frac{2}{3},\frac{i b}{(c+d x)^{3/2}}\right]}{3 d^2}$$

Result (type 4, 835 leaves):

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

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

$$\frac{9\,i\,b^2\,f\,\text{Cos}[a]\left(\frac{2\,\text{Gamma}\left[\frac{2}{3},-\frac{i\,b}{(c+d\,x)^{3/2}}\right]}{3\left(-\frac{i\,b}{(c+d\,x)^{3/2}}\right)^{2/3}(c+d\,x)}-\frac{2\,\text{Gamma}\left[\frac{2}{3},\frac{i\,b}{(c+d\,x)^{3/2}}\right]}{3\left(\frac{i\,b}{(c+d\,x)^{3/2}}\right)^{2/3}(c+d\,x)}\right)}{8\,d^2}+$$

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

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

$$\frac{9\,b^2\,f\left(\frac{2\,\text{Gamma}\left[\frac{2}{3},-\frac{i\,b}{(c+d\,x)^{3/2}}\right]}{3\left(-\frac{i\,b}{(c+d\,x)^{3/2}}\right)^{2/3}(c+d\,x)}+\frac{2\,\text{Gamma}\left[\frac{2}{3},\frac{i\,b}{(c+d\,x)^{3/2}}\right]}{3\left(\frac{i\,b}{(c+d\,x)^{3/2}}\right)^{2/3}(c+d\,x)}\right)\text{Sin}[a]}{8\,d^2}+\frac{1}{2\,d^2}$$

$$f\,\sqrt{c+d\,x}\,\text{Cos}\left[\frac{b}{(c+d\,x)^{3/2}}\right]\left(3\,b\,\text{Cos}[a]-2\,c\,\sqrt{c+d\,x}\,\text{Sin}[a]+(c+d\,x)^{3/2}\,\text{Sin}[a]\right)+$$

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

$$f\,\sqrt{c+d\,x}\,\left(-2\,c\,\sqrt{c+d\,x}\,\text{Cos}[a]+(c+d\,x)^{3/2}\,\text{Cos}[a]-3\,b\,\text{Sin}[a]\right)\text{Sin}\left[\frac{b}{(c+d\,x)^{3/2}}\right]$$

Problem 210: Result is not expressed in closed-form.

$$\int\frac{\text{Sin}\left[a+b\,(c+d\,x)^{1/3}\right]}{e+f\,x}\,dx$$

Optimal (type 4, 396 leaves, 11 steps):

$$\frac{\text{CosIntegral}\left[\frac{b\,(d\,e-c\,f)^{1/3}}{f^{1/3}}+b\,(c+d\,x)^{1/3}\right]\,\text{Sin}\left[a-\frac{b\,(d\,e-c\,f)^{1/3}}{f^{1/3}}\right]}{f}+\frac{1}{f}$$

$$\text{CosIntegral}\left[\frac{(-1)^{1/3}\,b\,(d\,e-c\,f)^{1/3}}{f^{1/3}}-b\,(c+d\,x)^{1/3}\right]\,\text{Sin}\left[a+\frac{(-1)^{1/3}\,b\,(d\,e-c\,f)^{1/3}}{f^{1/3}}\right]+$$

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

$$\frac{1}{f}\text{Cos}\left[a+\frac{(-1)^{1/3}\,b\,(d\,e-c\,f)^{1/3}}{f^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}\,b\,(d\,e-c\,f)^{1/3}}{f^{1/3}}-b\,(c+d\,x)^{1/3}\right]+$$

$$\frac{\text{Cos}\left[a-\frac{b\,(d\,e-c\,f)^{1/3}}{f^{1/3}}\right]\,\text{SinIntegral}\left[\frac{b\,(d\,e-c\,f)^{1/3}}{f^{1/3}}+b\,(c+d\,x)^{1/3}\right]}{f}+\frac{1}{f}$$

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

Result (type 7, 118 leaves):

$$\frac{1}{2\,f}\,i\,\left(\text{RootSum}\left[d\,e-c\,f+f\,\#1^3\,\&,\,e^{-i\,a-i\,b\,\#1}\,\text{ExpIntegralEi}\left[-i\,b\,\left((c+d\,x)^{1/3}-\#1\right)\right]\,\&\right]-\right.$$
$$\left.\text{RootSum}\left[d\,e-c\,f+f\,\#1^3\,\&,\,e^{i\,a+i\,b\,\#1}\,\text{ExpIntegralEi}\left[i\,b\,\left((c+d\,x)^{1/3}-\#1\right)\right]\,\&\right]\right)$$

Problem 211: Result is not expressed in closed-form.

$$\int\frac{\text{Sin}\left[a+b\,(c+d\,x)^{1/3}\right]}{(e+f\,x)^2}\,dx$$

Optimal (type 4, 555 leaves, 13 steps):

$$-\left(\left((-1)^{1/3}\, b\, d\, \text{Cos}\left[a+\frac{(-1)^{1/3}\, b\, (d\, e-c\, f)^{1/3}}{f^{1/3}}\right]\right.\right.$$

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

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

$$\left((-1)^{2/3}\, b\, d\, \text{Cos}\left[a-\frac{(-1)^{2/3}\, b\, (d\, e-c\, f)^{1/3}}{f^{1/3}}\right]\right.$$

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

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

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

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

$$\left((-1)^{2/3}\, b\, d\, \text{Sin}\left[a-\frac{(-1)^{2/3}\, b\, (d\, e-c\, f)^{1/3}}{f^{1/3}}\right]\right.$$

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

Result (type 7, 180 leaves):

$$\frac{1}{6\, f^2}\left(\frac{3\, i\, e^{-i\left(a+b\, (c+d\, x)^{1/3}\right)}\left(-1+e^{2\, i\left(a+b\, (c+d\, x)^{1/3}\right)}\right) f}{e+f\, x}+\right.$$

$$b\, d\, \text{RootSum}\left[d\, e-c\, f+f\, \#1^3\, \&,\ \frac{e^{-i\, a-i\, b\, \#1}\, \text{ExpIntegralEi}\left[-i\, b\left((c+d\, x)^{1/3}-\#1\right)\right]}{\#1^2}\, \&\right]+$$

$$\left.b\, d\, \text{RootSum}\left[d\, e-c\, f+f\, \#1^3\, \&,\ \frac{e^{i\, a+i\, b\, \#1}\, \text{ExpIntegralEi}\left[i\, b\left((c+d\, x)^{1/3}-\#1\right)\right]}{\#1^2}\, \&\right]\right)$$

Problem 212: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 513 leaves, 17 steps):

$$\frac{6 f (d e - c f) \cos\left[a + b (c + d x)^{2/3}\right]}{b^3 d^3} - \frac{3 (d e - c f)^2 (c + d x)^{1/3} \cos\left[a + b (c + d x)^{2/3}\right]}{2 b d^3} +$$

$$\frac{105 f^2 (c + d x) \cos\left[a + b (c + d x)^{2/3}\right]}{8 b^3 d^3} - \frac{3 f (d e - c f) (c + d x)^{4/3} \cos\left[a + b (c + d x)^{2/3}\right]}{b d^3} -$$

$$\frac{3 f^2 (c + d x)^{7/3} \cos\left[a + b (c + d x)^{2/3}\right]}{2 b d^3} + \frac{3 (d e - c f)^2 \sqrt{\frac{\pi}{2}} \cos[a] \text{FresnelC}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c + d x)^{1/3}\right]}{2 b^{3/2} d^3} +$$

$$\frac{315 f^2 \sqrt{\frac{\pi}{2}} \cos[a] \text{FresnelS}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c + d x)^{1/3}\right]}{16 b^{9/2} d^3} +$$

$$\frac{315 f^2 \sqrt{\frac{\pi}{2}} \text{FresnelC}\left[\sqrt{b} \sqrt{\frac{2}{\pi}} (c + d x)^{1/3}\right] \sin[a]}{16 b^{9/2} d^3} -$$

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

$$\frac{315 f^2 (c + d x)^{1/3} \sin\left[a + b (c + d x)^{2/3}\right]}{16 b^4 d^3} +$$

$$\frac{6 f (d e - c f) (c + d x)^{2/3} \sin\left[a + b (c + d x)^{2/3}\right]}{b^2 d^3} + \frac{21 f^2 (c + d x)^{5/3} \sin\left[a + b (c + d x)^{2/3}\right]}{4 b^2 d^3}$$

Result (type 4, 510 leaves) :

$$-\frac{1}{64\,b^{9/2}\,d^3}3\,i\left((\text{Cos}[a]+i\,\text{Sin}[a])\left((1+i)\left(-105\,i\,f^2+8\,b^3\,(d\,e-c\,f)^2\right)\sqrt{\frac{\pi}{2}}\,\text{Erfi}\left[\frac{(1+i)\,\sqrt{b}\,(c+d\,x)^{1/3}}{\sqrt{2}}\right]+\right.\right.$$
$$2\,\sqrt{b}\,\left(-105\,f^2\,(c+d\,x)^{1/3}-8\,i\,b^3\,d^2\,(c+d\,x)^{1/3}\,(e+f\,x)^2+\right.$$
$$\left.4\,b^2\,f\,(c+d\,x)^{2/3}\,(8\,d\,e-c\,f+7\,d\,f\,x)+2\,i\,b\,f\,(16\,d\,e+19\,c\,f+35\,d\,f\,x)\right)$$
$$\left.\left(\text{Cos}\left[b\,(c+d\,x)^{2/3}\right]+i\,\text{Sin}\left[b\,(c+d\,x)^{2/3}\right]\right)\right)-$$
$$\left(2\,\sqrt{b}\,\left(-105\,f^2\,(c+d\,x)^{1/3}+8\,i\,b^3\,d^2\,(c+d\,x)^{1/3}\,(e+f\,x)^2+\right.\right.$$
$$\left.4\,b^2\,f\,(c+d\,x)^{2/3}\,(8\,d\,e-c\,f+7\,d\,f\,x)-2\,i\,b\,f\,(16\,d\,e+19\,c\,f+35\,d\,f\,x)\right)-$$
$$(1+i)\,\left(105\,i\,f^2+8\,b^3\,(d^2\,e^2+c^2\,f^2)\right)\sqrt{\frac{\pi}{2}}\,\text{Erf}\left[\frac{(1+i)\,\sqrt{b}\,(c+d\,x)^{1/3}}{\sqrt{2}}\right]$$
$$\left(\text{Cos}\left[b\,(c+d\,x)^{2/3}\right]+i\,\text{Sin}\left[b\,(c+d\,x)^{2/3}\right]\right)+(8+8\,i)\,b^3\,c\,d\,e\,f\,\sqrt{2\,\pi}$$
$$\left.\text{Erf}\left[\frac{(1+i)\,\sqrt{b}\,(c+d\,x)^{1/3}}{\sqrt{2}}\right]\left(\text{Cos}\left[b\,(c+d\,x)^{2/3}\right]+i\,\text{Sin}\left[b\,(c+d\,x)^{2/3}\right]\right)\right)$$
$$\left.\left(\text{Cos}\left[a+b\,(c+d\,x)^{2/3}\right]-i\,\text{Sin}\left[a+b\,(c+d\,x)^{2/3}\right]\right)\right)$$

Problem 217: Result unnecessarily involves imaginary or complex numbers.

$$\int (e+f\,x)^2\,\text{Sin}\left[a+\frac{b}{(c+d\,x)^{1/3}}\right]\,dx$$

Optimal (type 4, 855 leaves, 29 steps):

$$\frac{b^5 f (d e - c f) (c + d x)^{1/3} \operatorname{Cos}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{120 d^3} - \frac{b^7 f^2 (c + d x)^{2/3} \operatorname{Cos}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{120960 d^3} + \frac{b (d e - c f)^2 (c + d x)^{2/3} \operatorname{Cos}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{2 d^3} - \frac{b^3 f (d e - c f) (c + d x) \operatorname{Cos}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{60 d^3} + \frac{b^5 f^2 (c + d x)^{4/3} \operatorname{Cos}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{20160 d^3} + \frac{b f (d e - c f) (c + d x)^{5/3} \operatorname{Cos}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{5 d^3} - \frac{b^3 f^2 (c + d x)^2 \operatorname{Cos}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{1008 d^3} + \frac{b f^2 (c + d x)^{8/3} \operatorname{Cos}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{24 d^3} - \frac{b^9 f^2 \operatorname{Cos}[a] \operatorname{CosIntegral}\left[\frac{b}{(c+d x)^{1/3}}\right]}{120960 d^3} + \frac{b^3 (d e - c f)^2 \operatorname{Cos}[a] \operatorname{CosIntegral}\left[\frac{b}{(c+d x)^{1/3}}\right]}{2 d^3} + \frac{b^6 f (d e - c f) \operatorname{CosIntegral}\left[\frac{b}{(c+d x)^{1/3}}\right] \operatorname{Sin}[a]}{120 d^3} + \frac{b^8 f^2 (c + d x)^{1/3} \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{120960 d^3} - \frac{b^2 (d e - c f)^2 (c + d x)^{1/3} \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{2 d^3} + \frac{b^4 f (d e - c f) (c + d x)^{2/3} \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{120 d^3} - \frac{b^6 f^2 (c + d x) \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{60480 d^3} + \frac{(d e - c f)^2 (c + d x) \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{d^3} - \frac{b^2 f (d e - c f) (c + d x)^{4/3} \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{20 d^3} + \frac{b^4 f^2 (c + d x)^{5/3} \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{5040 d^3} + \frac{f (d e - c f) (c + d x)^2 \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{d^3} - \frac{b^2 f^2 (c + d x)^{7/3} \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{168 d^3} + \frac{f^2 (c + d x)^3 \operatorname{Sin}\left[a + \frac{b}{(c+d x)^{1/3}}\right]}{3 d^3} + \frac{b^6 f (d e - c f) \operatorname{Cos}[a] \operatorname{SinIntegral}\left[\frac{b}{(c+d x)^{1/3}}\right]}{120 d^3} + \frac{b^9 f^2 \operatorname{Sin}[a] \operatorname{SinIntegral}\left[\frac{b}{(c+d x)^{1/3}}\right]}{120960 d^3} - \frac{b^3 (d e - c f)^2 \operatorname{Sin}[a] \operatorname{SinIntegral}\left[\frac{b}{(c+d x)^{1/3}}\right]}{2 d^3}$$

Result (type 4, 929 leaves) :

$$-\frac{1}{241920\,d^3}\,i\,\Bigg(\left(\mathrm{Cos}[a]+i\,\mathrm{Sin}[a]\right)$$

$$\Bigg(60480\,i\,b^3 d^2 e^2\,\mathrm{ExpIntegralEi}\left[\frac{i\,b}{(c+d\,x)^{1/3}}\right]+1008\,b^6\,d\,e\,f\,\mathrm{ExpIntegralEi}\left[\frac{i\,b}{(c+d\,x)^{1/3}}\right]-$$

$$120960\,i\,b^3\,c\,d\,e\,f\,\mathrm{ExpIntegralEi}\left[\frac{i\,b}{(c+d\,x)^{1/3}}\right]-i\,b^9 f^2\,\mathrm{ExpIntegralEi}\left[\frac{i\,b}{(c+d\,x)^{1/3}}\right]-$$

$$1008\,b^6\,c\,f^2\,\mathrm{ExpIntegralEi}\left[\frac{i\,b}{(c+d\,x)^{1/3}}\right]+60480\,i\,b^3 c^2 f^2\,\mathrm{ExpIntegralEi}\left[\frac{i\,b}{(c+d\,x)^{1/3}}\right]+$$

$$(c+d\,x)^{1/3}\Big(b^8 f^2-i\,b^7 f^2 (c+d\,x)^{1/3}-2\,b^6 f^2 (c+d\,x)^{2/3}+$$

$$24\,i\,b^3 f\,(c+d\,x)^{2/3}\,(-84\,d\,e+79\,c\,f-5\,d\,f\,x)+$$

$$6\,i\,b^5 f\,(168\,d\,e-167\,c\,f+d\,f\,x)+24\,b^4 f\,(c+d\,x)^{1/3}\,(42\,d\,e-41\,c\,f+d\,f\,x)+$$

$$40320\,(c+d\,x)^{2/3}\left(c^2 f^2-c\,d\,f\,(3\,e+f\,x)+d^2\left(3\,e^2+3\,e\,f\,x+f^2 x^2\right)\right)+$$

$$1008\,i\,b\,(c+d\,x)^{1/3}\left(41\,c^2 f^2-2\,c\,d\,f\,(48\,e+7\,f\,x)+d^2\left(60\,e^2+24\,e\,f\,x+5\,f^2 x^2\right)\right)-$$

$$144\,b^2\left(383\,c^2 f^2-2\,c\,d\,f\,(399\,e+16\,f\,x)+d^2\left(420\,e^2+42\,e\,f\,x+5\,f^2 x^2\right)\right)\Big)$$

$$\left(\mathrm{Cos}\left[\frac{b}{(c+d\,x)^{1/3}}\right]+i\,\mathrm{Sin}\left[\frac{b}{(c+d\,x)^{1/3}}\right]\right)\Bigg)-$$

$$\Bigg((c+d\,x)^{1/3}\Big(b^8 f^2+i\,b^7 f^2 (c+d\,x)^{1/3}-2\,b^6 f^2 (c+d\,x)^{2/3}-6\,i\,b^5 f\,(168\,d\,e-167\,c\,f+d\,f\,x)+$$

$$24\,b^4 f\,(c+d\,x)^{1/3}\,(42\,d\,e-41\,c\,f+d\,f\,x)+24\,i\,b^3 f\,(c+d\,x)^{2/3}\,(84\,d\,e-79\,c\,f+$$

$$5\,d\,f\,x)+40320\,(c+d\,x)^{2/3}\left(c^2 f^2-c\,d\,f\,(3\,e+f\,x)+d^2\left(3\,e^2+3\,e\,f\,x+f^2 x^2\right)\right)-$$

$$1008\,i\,b\,(c+d\,x)^{1/3}\left(41\,c^2 f^2-2\,c\,d\,f\,(48\,e+7\,f\,x)+d^2\left(60\,e^2+24\,e\,f\,x+5\,f^2 x^2\right)\right)-$$

$$144\,b^2\left(383\,c^2 f^2-2\,c\,d\,f\,(399\,e+16\,f\,x)+d^2\left(420\,e^2+42\,e\,f\,x+5\,f^2 x^2\right)\right)\Big)+$$

$$i\,b^3\left(-60480\,d^2 e^2+1008\left(-i\,b^3+120\,c\right)d\,e\,f+\left(b^6+1008\,i\,b^3 c-60480\,c^2\right)f^2\right)$$

$$\mathrm{ExpIntegralEi}\left[-\frac{i\,b}{(c+d\,x)^{1/3}}\right]\left(\mathrm{Cos}\left[\frac{b}{(c+d\,x)^{1/3}}\right]+i\,\mathrm{Sin}\left[\frac{b}{(c+d\,x)^{1/3}}\right]\right)\Bigg)$$

$$\left(\mathrm{Cos}\left[a+\frac{b}{(c+d\,x)^{1/3}}\right]-i\,\mathrm{Sin}\left[a+\frac{b}{(c+d\,x)^{1/3}}\right]\right)\Bigg)$$

Problem 220: Result is not expressed in closed-form.

$$\int \frac{\mathrm{Sin}\left[a+\frac{b}{(c+d\,x)^{1/3}}\right]}{e+f\,x}\,dx$$

Optimal (type 4, 434 leaves, 16 steps):

$$-\frac{3\,\text{CosIntegral}\left[\frac{b}{(c+d\,x)^{1/3}}\right]\text{Sin}[a]}{f}+\frac{\text{CosIntegral}\left[\frac{b\,f^{1/3}}{(d\,e-c\,f)^{1/3}}+\frac{b}{(c+d\,x)^{1/3}}\right]\text{Sin}\left[a-\frac{b\,f^{1/3}}{(d\,e-c\,f)^{1/3}}\right]}{f}+$$

$$\frac{\text{CosIntegral}\left[\frac{(-1)^{1/3}\,b\,f^{1/3}}{(d\,e-c\,f)^{1/3}}-\frac{b}{(c+d\,x)^{1/3}}\right]\text{Sin}\left[a+\frac{(-1)^{1/3}\,b\,f^{1/3}}{(d\,e-c\,f)^{1/3}}\right]}{f}+$$

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

$$\frac{3\,\text{Cos}[a]\,\text{SinIntegral}\left[\frac{b}{(c+d\,x)^{1/3}}\right]}{f}-\frac{\text{Cos}\left[a+\frac{(-1)^{1/3}\,b\,f^{1/3}}{(d\,e-c\,f)^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{1/3}\,b\,f^{1/3}}{(d\,e-c\,f)^{1/3}}-\frac{b}{(c+d\,x)^{1/3}}\right]}{f}+$$

$$\frac{\text{Cos}\left[a-\frac{b\,f^{1/3}}{(d\,e-c\,f)^{1/3}}\right]\text{SinIntegral}\left[\frac{b\,f^{1/3}}{(d\,e-c\,f)^{1/3}}+\frac{b}{(c+d\,x)^{1/3}}\right]}{f}+$$

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

Result (type 7, 170 leaves):

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

$$\left.\text{RootSum}\left[d\,e-c\,f+f\,\#1^3\,\&,\,e^{-\frac{i\,b}{\#1}}\,\text{ExpIntegralEi}\left[-i\,b\left(\frac{1}{(c+d\,x)^{1/3}}-\frac{1}{\#1}\right)\right]\&\right]\right)$$

$$(\text{Cos}[a]-i\,\text{Sin}[a])+\left(3\,\text{ExpIntegralEi}\left[\frac{i\,b}{(c+d\,x)^{1/3}}\right]-\text{RootSum}\left[d\,e-c\,f+f\,\#1^3\,\&,\right.\right.$$

$$\left.\left.\left.e^{\frac{i\,b}{\#1}}\,\text{ExpIntegralEi}\left[i\,b\left(\frac{1}{(c+d\,x)^{1/3}}-\frac{1}{\#1}\right)\right]\&\right]\right)(\text{Cos}[a]+i\,\text{Sin}[a])\right)$$

Problem 221: Result is not expressed in closed-form.

$$\int\frac{\text{Sin}\left[a+\frac{b}{(c+d\,x)^{1/3}}\right]}{(e+f\,x)^2}\,dx$$

Optimal (type 4, 566 leaves, 13 steps):

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

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

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

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

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

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

Result (type 7, 313 leaves) :

$$\frac{1}{6\, f\, (-d\, e+c\, f)\, (e+f\, x)}\left((\text{Cos}[a]+i\, \text{Sin}[a])\left(b\, d\, (e+f\, x)\, \text{RootSum}\left[d\, e-c\, f+f\, \#1^3\, \&,\right.\right.\right.$$
$$\left.\frac{1}{\#1}\left(\text{ExpIntegralEi}\left[\frac{i\, b}{(c+d\, x)^{1/3}}\right]-e^{\frac{i\, b}{\#1}}\, \text{ExpIntegralEi}\left[i\, b\left(\frac{1}{(c+d\, x)^{1/3}}-\frac{1}{\#1}\right)\right]\right)\&\right]+$$
$$\left.(c+d\, x)\left(3\, i\, f\, \text{Cos}\left[\frac{b}{(c+d\, x)^{1/3}}\right]-3\, f\, \text{Sin}\left[\frac{b}{(c+d\, x)^{1/3}}\right]\right)\right)+$$
$$i\left(-3\, c\, f-3\, d\, f\, x+b\, d\, (e+f\, x)\, \text{RootSum}\left[d\, e-c\, f+f\, \#1^3\, \&,\right.\right.$$
$$\left.\frac{1}{\#1}\left(\text{ExpIntegralEi}\left[-\frac{i\, b}{(c+d\, x)^{1/3}}\right]-e^{-\frac{i\, b}{\#1}}\, \text{ExpIntegralEi}\left[-i\, b\left(\frac{1}{(c+d\, x)^{1/3}}-\frac{1}{\#1}\right)\right]\right)\&\right]$$
$$\left.\left(-i\, \text{Cos}\left[\frac{b}{(c+d\, x)^{1/3}}\right]+\text{Sin}\left[\frac{b}{(c+d\, x)^{1/3}}\right]\right)\right)$$
$$\left.\left(\text{Cos}\left[a+\frac{b}{(c+d\, x)^{1/3}}\right]-i\, \text{Sin}\left[a+\frac{b}{(c+d\, x)^{1/3}}\right]\right)\right)$$

Problem 222: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 630 leaves, 24 steps) :

$$\frac{2\,b\,(d\,e-c\,f)^2\,(c+d\,x)^{1/3}\,\text{Cos}\left[a+\frac{b}{(c+d\,x)^{2/3}}\right]}{d^3}-\frac{8\,b^3\,f^2\,(c+d\,x)\,\text{Cos}\left[a+\frac{b}{(c+d\,x)^{2/3}}\right]}{315\,d^3}+\frac{b\,f\,(d\,e-c\,f)\,(c+d\,x)^{4/3}\,\text{Cos}\left[a+\frac{b}{(c+d\,x)^{2/3}}\right]}{2\,d^3}+$$

$$\frac{2\,b\,f^2\,(c+d\,x)^{7/3}\,\text{Cos}\left[a+\frac{b}{(c+d\,x)^{2/3}}\right]}{21\,d^3}+\frac{b^3\,f\,(d\,e-c\,f)\,\text{Cos}[a]\,\text{CosIntegral}\left[\frac{b}{(c+d\,x)^{2/3}}\right]}{2\,d^3}-$$

$$\frac{16\,b^{9/2}\,f^2\,\sqrt{2\,\pi}\,\text{Cos}[a]\,\text{FresnelC}\left[\frac{\sqrt{b}\,\sqrt{\frac{2}{\pi}}}{(c+d\,x)^{1/3}}\right]}{315\,d^3}+\frac{2\,b^{3/2}\,(d\,e-c\,f)^2\,\sqrt{2\,\pi}\,\text{Cos}[a]\,\text{FresnelS}\left[\frac{\sqrt{b}\,\sqrt{\frac{2}{\pi}}}{(c+d\,x)^{1/3}}\right]}{d^3}+$$

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

$$\frac{16\,b^{9/2}\,f^2\,\sqrt{2\,\pi}\,\text{FresnelS}\left[\frac{\sqrt{b}\,\sqrt{\frac{2}{\pi}}}{(c+d\,x)^{1/3}}\right]\,\text{Sin}[a]}{315\,d^3}+\frac{16\,b^4\,f^2\,(c+d\,x)^{1/3}\,\text{Sin}\left[a+\frac{b}{(c+d\,x)^{2/3}}\right]}{315\,d^3}-$$

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

$$\frac{4\,b^2\,f^2\,(c+d\,x)^{5/3}\,\text{Sin}\left[a+\frac{b}{(c+d\,x)^{2/3}}\right]}{105\,d^3}+\frac{f\,(d\,e-c\,f)\,(c+d\,x)^2\,\text{Sin}\left[a+\frac{b}{(c+d\,x)^{2/3}}\right]}{d^3}+$$

$$\frac{f^2\,(c+d\,x)^3\,\text{Sin}\left[a+\frac{b}{(c+d\,x)^{2/3}}\right]}{3\,d^3}-\frac{b^3\,f\,(d\,e-c\,f)\,\text{Sin}[a]\,\text{SinIntegral}\left[\frac{b}{(c+d\,x)^{2/3}}\right]}{2\,d^3}$$

Result (type 4, 613 leaves) :

$$\frac{1}{1260\, d^3} i\, e^{-i a} \left(e^{-\frac{i b}{(c+d x)^{2/3}}} (c+d x)^{1/3} \left(32 b^4 f^2+16 i b^3 f^2 (c+d x)^{2/3}+3 b^2 f (c+d x)^{1/3} (-105 d e+97 c f-8 d f x)-15 i b \left(84 d^2 e^2+21 d e f (-7 c+d x)+f^2 \left(67 c^2-13 c d x+4 d^2 x^2\right)\right)+210 (c+d x)^{2/3} \left(c^2 f^2-c d f (3 e+f x)+d^2 \left(3 e^2+3 e f x+f^2 x^2\right)\right)\right)-e^{i \left(2 a+\frac{b}{(c+d x)^{2/3}}\right)} (c+d x)^{1/3} \left(32 b^4 f^2-16 i b^3 f^2 (c+d x)^{2/3}+3 b^2 f (c+d x)^{1/3} (-105 d e+97 c f-8 d f x)+15 i b \left(84 d^2 e^2+21 d e f (-7 c+d x)+f^2 \left(67 c^2-13 c d x+4 d^2 x^2\right)\right)+210 (c+d x)^{2/3} \left(c^2 f^2-c d f (3 e+f x)+d^2 \left(3 e^2+3 e f x+f^2 x^2\right)\right)\right)+4 (-1)^{1/4} b^{3/2} e^{2 i a} \left(315 i d^2 e^2-630 i c d e f+\left(8 b^3+315 i c^2\right) f^2\right) \sqrt{\pi}\, \text{Erfi}\left[\frac{(-1)^{1/4} \sqrt{b}}{(c+d x)^{1/3}}\right]-4 (-1)^{1/4} b^{3/2} \left(315 d^2 e^2-630 c d e f+\left(8 i b^3+315 c^2\right) f^2\right) \sqrt{\pi}\, \text{Erfi}\left[\frac{(-1)^{3/4} \sqrt{b}}{(c+d x)^{1/3}}\right]+315 i b^3 f (-d e+c f)\, \text{ExpIntegralEi}\left[-\frac{i b}{(c+d x)^{2/3}}\right]+315 i b^3 e^{2 i a} f (-d e+c f)\, \text{ExpIntegralEi}\left[\frac{i b}{(c+d x)^{2/3}}\right]\right)$$

Problem 226: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 25 leaves, 0 steps):

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

Result (type 1, 1 leaves):

???

Problem 260: Unable to integrate problem.

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

Optimal (type 4, 503 leaves, 14 steps):

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

Result (type 8, 18 leaves):

$$\int x^3 \text{Sin}\left[a+b (c+d x)^n\right] dx$$

Problem 261: Unable to integrate problem.

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

Optimal (type 4, 369 leaves, 11 steps):

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

Result (type 8, 18 leaves):

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

Problem 266: Unable to integrate problem.

$$\int x^3\,\left(a+b\operatorname{Sin}\left[c+d\,(f+g\,x)^n\right]\right)\,dx$$

Optimal (type 4, 519 leaves, 16 steps):

$$\frac{a\,x^4}{4}-\frac{i\,b\,e^{i\,c}\,f^3\,(f+g\,x)\,\left(-i\,d\,(f+g\,x)^n\right)^{-1/n}\operatorname{Gamma}\left[\frac{1}{n},-i\,d\,(f+g\,x)^n\right]}{2\,g^4\,n}+$$
$$\frac{i\,b\,e^{-i\,c}\,f^3\,(f+g\,x)\,\left(i\,d\,(f+g\,x)^n\right)^{-1/n}\operatorname{Gamma}\left[\frac{1}{n},i\,d\,(f+g\,x)^n\right]}{2\,g^4\,n}+$$
$$\frac{3\,i\,b\,e^{i\,c}\,f^2\,(f+g\,x)^2\,\left(-i\,d\,(f+g\,x)^n\right)^{-2/n}\operatorname{Gamma}\left[\frac{2}{n},-i\,d\,(f+g\,x)^n\right]}{2\,g^4\,n}-$$
$$\frac{3\,i\,b\,e^{-i\,c}\,f^2\,(f+g\,x)^2\,\left(i\,d\,(f+g\,x)^n\right)^{-2/n}\operatorname{Gamma}\left[\frac{2}{n},i\,d\,(f+g\,x)^n\right]}{2\,g^4\,n}-$$
$$\frac{3\,i\,b\,e^{i\,c}\,f\,(f+g\,x)^3\,\left(-i\,d\,(f+g\,x)^n\right)^{-3/n}\operatorname{Gamma}\left[\frac{3}{n},-i\,d\,(f+g\,x)^n\right]}{2\,g^4\,n}+$$
$$\frac{3\,i\,b\,e^{-i\,c}\,f\,(f+g\,x)^3\,\left(i\,d\,(f+g\,x)^n\right)^{-3/n}\operatorname{Gamma}\left[\frac{3}{n},i\,d\,(f+g\,x)^n\right]}{2\,g^4\,n}+$$
$$\frac{i\,b\,e^{i\,c}\,(f+g\,x)^4\,\left(-i\,d\,(f+g\,x)^n\right)^{-4/n}\operatorname{Gamma}\left[\frac{4}{n},-i\,d\,(f+g\,x)^n\right]}{2\,g^4\,n}-$$
$$\frac{i\,b\,e^{-i\,c}\,(f+g\,x)^4\,\left(i\,d\,(f+g\,x)^n\right)^{-4/n}\operatorname{Gamma}\left[\frac{4}{n},i\,d\,(f+g\,x)^n\right]}{2\,g^4\,n}$$

Result (type 8, 22 leaves):

$$\int x^3\,\left(a+b\operatorname{Sin}\left[c+d\,(f+g\,x)^n\right]\right)\,dx$$

Problem 267: Unable to integrate problem.

$$\int x^2\,\left(a+b\operatorname{Sin}\left[c+d\,(f+g\,x)^n\right]\right)\,dx$$

Optimal (type 4, 383 leaves, 13 steps):

$$\frac{a x^3}{3}+\frac{i b e^{i c} f^2 (f+g x) \left(-i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n},-i d (f+g x)^n\right]}{2 g^3 n}-\frac{i b e^{-i c} f^2 (f+g x) \left(i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n},i d (f+g x)^n\right]}{2 g^3 n}-\frac{i b e^{i c} f (f+g x)^2 \left(-i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n},-i d (f+g x)^n\right]}{g^3 n}+\frac{i b e^{-i c} f (f+g x)^2 \left(i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n},i d (f+g x)^n\right]}{g^3 n}+\frac{i b e^{i c} (f+g x)^3 \left(-i d (f+g x)^n\right)^{-3/n} \text{Gamma}\left[\frac{3}{n},-i d (f+g x)^n\right]}{2 g^3 n}-\frac{i b e^{-i c} (f+g x)^3 \left(i d (f+g x)^n\right)^{-3/n} \text{Gamma}\left[\frac{3}{n},i d (f+g x)^n\right]}{2 g^3 n}$$

Result (type 8, 22 leaves):

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

Problem 272: Unable to integrate problem.

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

Optimal (type 4, 856 leaves, 28 steps):

$$\frac{(2a^2+b^2) f^2 x}{2 g^2} - \frac{(2a^2+b^2) f (f+g x)^2}{2 g^3} + \frac{(2a^2+b^2)(f+g x)^3}{6 g^3} +$$
$$\frac{i a b e^{i c} f^2 (f+g x) \left(-i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n}, -i d (f+g x)^n\right]}{g^3 n} -$$
$$\frac{i a b e^{-i c} f^2 (f+g x) \left(i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n}, i d (f+g x)^n\right]}{g^3 n} + \frac{1}{g^3 n}$$
$$2^{-2-\frac{1}{n}} b^2 e^{2 i c} f^2 (f+g x) \left(-i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n}, -2 i d (f+g x)^n\right] +$$
$$\frac{1}{g^3 n} 2^{-2-\frac{1}{n}} b^2 e^{-2 i c} f^2 (f+g x) \left(i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n}, 2 i d (f+g x)^n\right] -$$
$$\frac{2 i a b e^{i c} f (f+g x)^2 \left(-i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n}, -i d (f+g x)^n\right]}{g^3 n} +$$
$$\frac{2 i a b e^{-i c} f (f+g x)^2 \left(i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n}, i d (f+g x)^n\right]}{g^3 n} - \frac{1}{g^3 n}$$
$$2^{-1-\frac{2}{n}} b^2 e^{2 i c} f (f+g x)^2 \left(-i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n}, -2 i d (f+g x)^n\right] -$$
$$\frac{1}{g^3 n} 2^{-1-\frac{2}{n}} b^2 e^{-2 i c} f (f+g x)^2 \left(i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n}, 2 i d (f+g x)^n\right] +$$
$$\frac{i a b e^{i c} (f+g x)^3 \left(-i d (f+g x)^n\right)^{-3/n} \text{Gamma}\left[\frac{3}{n}, -i d (f+g x)^n\right]}{g^3 n} -$$
$$\frac{i a b e^{-i c} (f+g x)^3 \left(i d (f+g x)^n\right)^{-3/n} \text{Gamma}\left[\frac{3}{n}, i d (f+g x)^n\right]}{g^3 n} + \frac{1}{g^3 n}$$
$$2^{-2-\frac{3}{n}} b^2 e^{2 i c} (f+g x)^3 \left(-i d (f+g x)^n\right)^{-3/n} \text{Gamma}\left[\frac{3}{n}, -2 i d (f+g x)^n\right] +$$
$$\frac{2^{-2-\frac{3}{n}} b^2 e^{-2 i c} (f+g x)^3 \left(i d (f+g x)^n\right)^{-3/n} \text{Gamma}\left[\frac{3}{n}, 2 i d (f+g x)^n\right]}{g^3 n}$$

Result (type 8, 24 leaves):

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

Problem 273: Unable to integrate problem.

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

Optimal (type 4, 556 leaves, 19 steps):

$$-\frac{\left(2 a^2+b^2\right) f x}{2 g}+\frac{\left(2 a^2+b^2\right) (f+g x)^2}{4 g^2}-\frac{i a b e^{i c} f (f+g x) \left(-i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n},-i d (f+g x)^n\right]}{g^2 n}+\frac{i a b e^{-i c} f (f+g x) \left(i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n},i d (f+g x)^n\right]}{g^2 n}-\frac{1}{g^2 n} 2^{-2-\frac{1}{n}} b^2 e^{2 i c} f (f+g x) \left(-i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n},-2 i d (f+g x)^n\right]-\frac{2^{-2-\frac{1}{n}} b^2 e^{-2 i c} f (f+g x) \left(i d (f+g x)^n\right)^{-1/n} \text{Gamma}\left[\frac{1}{n},2 i d (f+g x)^n\right]}{g^2 n}+\frac{i a b e^{i c} (f+g x)^2 \left(-i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n},-i d (f+g x)^n\right]}{g^2 n}-\frac{i a b e^{-i c} (f+g x)^2 \left(i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n},i d (f+g x)^n\right]}{g^2 n}+\frac{1}{g^2 n} 4^{-1-\frac{1}{n}} b^2 e^{2 i c} (f+g x)^2 \left(-i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n},-2 i d (f+g x)^n\right]+\frac{4^{-1-\frac{1}{n}} b^2 e^{-2 i c} (f+g x)^2 \left(i d (f+g x)^n\right)^{-2/n} \text{Gamma}\left[\frac{2}{n},2 i d (f+g x)^n\right]}{g^2 n}$$

Result (type 8, 22 leaves) :

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

Problem 282: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 25 leaves, 0 steps) :

$$\text{Int}\left[\frac{x^2}{\left(a+b \text{Sin}\left[c+d (f+g x)^n\right]\right)^2},x\right]$$

Result (type 1, 1 leaves) :

???

Problem 283: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 23 leaves, 0 steps) :

$$\text{Int}\left[\frac{x}{\left(a+b\,\text{Sin}\left[c+d\,\left(f+g\,x\right)^{n}\right]\right)^{2}},\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 285: Attempted integration timed out after 120 seconds.

$$\int\frac{1}{x\,\left(a+b\,\text{Sin}\left[c+d\,\left(f+g\,x\right)^{n}\right]\right)^{2}}\,dx$$

Optimal (type 8, 25 leaves, 0 steps):

$$\text{Int}\left[\frac{1}{x\,\left(a+b\,\text{Sin}\left[c+d\,\left(f+g\,x\right)^{n}\right]\right)^{2}},\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 286: Attempted integration timed out after 120 seconds.

$$\int\frac{1}{x^{2}\,\left(a+b\,\text{Sin}\left[c+d\,\left(f+g\,x\right)^{n}\right]\right)^{2}}\,dx$$

Optimal (type 8, 25 leaves, 0 steps):

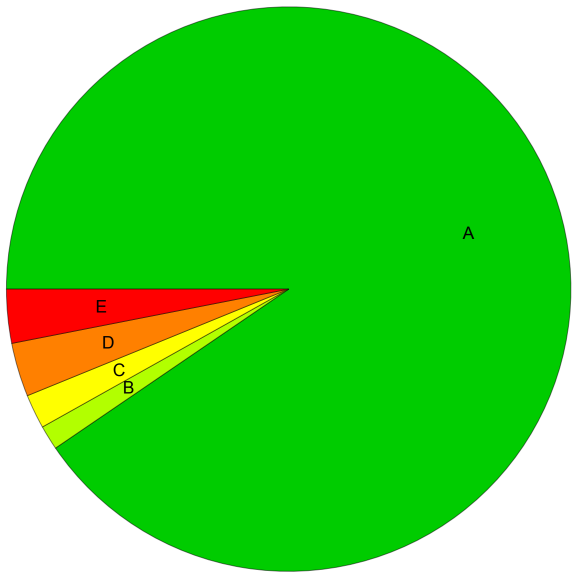
$$\text{Int}\left[\frac{1}{x^{2}\,\left(a+b\,\text{Sin}\left[c+d\,\left(f+g\,x\right)^{n}\right]\right)^{2}},\,x\right]$$

Result (type 1, 1 leaves):

???

Summary of Integration Test Results

357 integration problems



A - 323 optimal antiderivatives

B - 5 more than twice size of optimal antiderivatives

C - 7 unnecessarily complex antiderivatives

D - 11 unable to integrate problems

E - 11 integration timeouts