Mathematica 11.3 Integration Test Results

Test results for the 113 problems in "4.1.11 (e x)^m (a+b x^n)^p sin.m"

Problem 31: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 149 leaves, 12 steps):

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

Result (type 4, 641 leaves):

$$\frac{1}{2 a^2 b \left(a+b x\right)} e^{-\frac{i d (2 a+b x)}{b}}$$

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

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

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

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

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

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

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

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

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

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

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

Problem 37: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 261 leaves, 17 steps) :

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

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

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

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

Result (type 4, 2093 leaves) :

$$-\frac{1}{a} 2 b \, \text{Cos}[c]$$

$$\bigg(\frac{1}{8 b^3 (a+b x)^2} i \, e^{-\frac{i d (2 a+b x)}{b}} \Big(-1+e^{\frac{2 i a d}{b}}\Big) \bigg(-b \bigg(b \Big(1+e^{\frac{2 i d (a+b x)}{b}}\Big)+i d \Big(-1+e^{\frac{2 i d (a+b x)}{b}}\Big) (a+b x)\bigg)-$$

$$d^2 e^{\frac{i d (a+b x)}{b}} (a+b x)^2 \, \text{ExpIntegralEi}\Big[-\frac{i d (a+b x)}{b}\Big]-$$

$$d^2 e^{\frac{i d (a+b x)}{b}} (a+b x)^2 \, \text{ExpIntegralEi}\Big[\frac{i d (a+b x)}{b}\Big]\bigg)+\frac{1}{8 b^3 (a+b x)^2} i \, e^{-\frac{i d (2 a+b x)}{b}}$$

$$\Big(1+e^{\frac{2 i a d}{b}}\Big) \bigg(b \bigg(b \Big(-1+e^{\frac{2 i d (a+b x)}{b}}\Big)+i d \Big(1+e^{\frac{2 i d (a+b x)}{b}}\Big) (a+b x)\bigg)-d^2 e^{\frac{i d (a+b x)}{b}} (a+b x)^2$$

$$\text{ExpIntegralEi}\Big[-\frac{i d (a+b x)}{b}\Big]+d^2 e^{\frac{i d (a+b x)}{b}} (a+b x)^2 \, \text{ExpIntegralEi}\Big[\frac{i d (a+b x)}{b}\Big]\bigg)\bigg)-$$

$$\frac{1}{a^2} b^2 \, \text{Cos}[c] \bigg(\frac{1}{4 b^3 (a+b x)} e^{-\frac{i d (2 a+b x)}{b}} \Big(1+e^{\frac{2 i a d}{b}}\Big) \bigg(i b \Big(-1+e^{\frac{2 i d (a+b x)}{b}}\Big)+d \, e^{\frac{i d (a+b x)}{b}} (a+b x)$$

$$\text{ExpIntegralEi}\Big[-\frac{i d (a+b x)}{b}\Big]+d \, e^{\frac{i d (a+b x)}{b}} (a+b x) \, \text{ExpIntegralEi}\Big[\frac{i d (a+b x)}{b}\Big]\bigg)+$$

$$\frac{1}{8 b^4 (a+b x)^2} i a \, e^{-\frac{i d (2 a+b x)}{b}} \Big(1+e^{\frac{2 i a d}{b}}\Big) \bigg(-b \bigg(b \Big(-1+e^{\frac{2 i d (a+b x)}{b}}\Big)+i d \Big(1+e^{\frac{2 i d (a+b x)}{b}}\Big) (a+b x)\bigg)+$$

$$d^2 e^{\frac{i d (a+b x)}{b}} (a+b x)^2 \, \text{ExpIntegralEi}\Big[-\frac{i d (a+b x)}{b}\Big]-$$

$$d^2 e^{\frac{i d (a+b x)}{b}} (a+b x)^2 \, \text{ExpIntegralEi}\Big[\frac{i d (a+b x)}{b}\Big]\bigg)+\frac{1}{8 b^4 (a+b x)^2}$$

$$a \, e^{-\frac{i d (2 a+b x)}{b}} \Big(-1+e^{\frac{2 i a d}{b}}\Big) \bigg(b \bigg(i b \Big(1+e^{\frac{2 i d (a+b x)}{b}}\Big)-d \Big(-1+e^{\frac{2 i d (a+b x)}{b}}\Big) (a+b x)\bigg)+$$

$$i d^2 e^{\frac{i d (a+b x)}{b}} (a+b x)^2 \, \text{ExpIntegralEi}\Big[-\frac{i d (a+b x)}{b}\Big]+$$

$$i d^2 e^{\frac{i d (a+b x)}{b}} (a+b x)^2 \, \text{ExpIntegralEi}\Big[\frac{i d (a+b x)}{b}\Big]\bigg)+\frac{1}{4 b^3 (a+b x)}$$

$$e^{-\frac{i d (2 a+b x)}{b}} \Big(-1+e^{\frac{2 i a d}{b}}\Big) \bigg(d \, e^{\frac{i d (a+b x)}{b}} (a+b x) \, \text{ExpIntegralEi}\Big[-\frac{i d (a+b x)}{b}\Big]-$$

$$i \bigg(b+b \, e^{\frac{2 i d (a+b x)}{b}}-i d \, e^{\frac{i d (a+b x)}{b}} (a+b x) \, \text{ExpIntegralEi}\Big[\frac{i d (a+b x)}{b}\Big]\bigg)\bigg)\bigg)-$$

$$\frac{1}{a^2} b^2 \bigg(-\frac{1}{4 b^3 (a+b x)} e^{-\frac{i d (2 a+b x)}{b}} \Big(1+e^{\frac{2 i a d}{b}}\Big) \bigg(b+b \, e^{\frac{2 i d (a+b x)}{b}}+i d \, e^{\frac{i d (a+b x)}{b}} (a+b x) \, \text{ExpIntegralEi}\Big[$$

$$-\frac{i d (a+b x)}{b}\Big]-i d \, e^{\frac{i d (a+b x)}{b}} (a+b x) \, \text{ExpIntegralEi}\Big[\frac{i d (a+b x)}{b}\Big]\bigg)-\frac{1}{4 b^3 (a+b x)}$$

$$e^{-\frac{i d (2 a+b x)}{b}} \Big(-1+e^{\frac{2 i a d}{b}}\Big) \bigg(b-b \, e^{\frac{2 i d (a+b x)}{b}}+i d \, e^{\frac{i d (a+b x)}{b}} (a+b x) \, \text{ExpIntegralEi}\Big[-\frac{i d (a+b x)}{b}\Big]+$$

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

$$a\, e^{-\frac{i\, d\, (2\, a+b\, x)}{b}} \left(-1+e^{\frac{2\, i\, a\, d}{b}}\right) \Bigg(b \left(b \left(-1+e^{\frac{2\, i\, d\, (a+b\, x)}{b}}\right) + i\, d \left(1+e^{\frac{2\, i\, d\, (a+b\, x)}{b}}\right) (a+b\, x)\right) -$$

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

$$d^2\, e^{\frac{i\, d\, (a+b\, x)}{b}} (a+b\, x)^2\, \text{ExpIntegralEi}\left[\frac{i\, d\, (a+b\, x)}{b}\right]\Bigg) + \frac{1}{8\, b^4\, (a+b\, x)^2}$$

$$a\, e^{-\frac{i\, d\, (2\, a+b\, x)}{b}} \left(1+e^{\frac{2\, i\, a\, d}{b}}\right) \Bigg(b \left(b \left(1+e^{\frac{2\, i\, d\, (a+b\, x)}{b}}\right) + i\, d \left(-1+e^{\frac{2\, i\, d\, (a+b\, x)}{b}}\right) (a+b\, x)\right) +$$

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

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

$$\frac{1}{a}\, 2\, b \Bigg(\frac{1}{8\, b^3\, (a+b\, x)^2} e^{-\frac{i\, d\, (2\, a+b\, x)}{b}} \left(-1+e^{\frac{2\, i\, a\, d}{b}}\right) \Bigg(b \left(b \left(-1+e^{\frac{2\, i\, d\, (a+b\, x)}{b}}\right) + i\, d \left(1+e^{\frac{2\, i\, d\, (a+b\, x)}{b}}\right) (a+b\, x)\right) -$$

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

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

$$e^{-\frac{i\, d\, (2\, a+b\, x)}{b}} \left(1+e^{\frac{2\, i\, a\, d}{b}}\right) \Bigg(b \left(b \left(1+e^{\frac{2\, i\, d\, (a+b\, x)}{b}}\right) + i\, d \left(-1+e^{\frac{2\, i\, d\, (a+b\, x)}{b}}\right) (a+b\, x)\right) +$$

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

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

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

$$2\, \text{Cos}[c]\, \text{SinIntegral}[d\, x] -$$

$$2\, \text{Cos}\left[c - \frac{a\, d}{b}\right] \text{SinIntegral}\left[\frac{a\, d}{b} + d\, x\right]\Bigg)$$

Problem 38: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 299 leaves, 21 steps):

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

Result (type 4, 2557 leaves):

$$-\frac{\left(2 a^2+5 a b x+2 b^2 x^2\right)\,\text{Cos}[d x]\,\text{Sin}[c]}{2 a^3 x (a+b x)^2}+\frac{1}{4 a^3}\, i \left(-4 i b^2+a b d\right)$$
$$\left(\text{Cos}[c]\left(\frac{1}{4 b^2 (a+b x)} e^{-\frac{i d (2 a+b x)}{b}}\left(1+e^{\frac{2 i a d}{b}}\right)\left(i b\left(-1+e^{\frac{2 i d (a+b x)}{b}}\right)+d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\right.\right.\right.$$
$$\left.\text{ExpIntegralEi}\left[-\frac{i d (a+b x)}{b}\right]+d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[\frac{i d (a+b x)}{b}\right]\right)+$$
$$\frac{1}{4 b^2 (a+b x)} e^{-\frac{i d (2 a+b x)}{b}}\left(-1+e^{\frac{2 i a d}{b}}\right)\left(d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[-\frac{i d (a+b x)}{b}\right]-\right.$$
$$\left.\left.i\left(b+b\, e^{\frac{2 i d (a+b x)}{b}}-i d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[\frac{i d (a+b x)}{b}\right]\right)\right)\right)+$$
$$\left(-\frac{1}{4 b^2 (a+b x)} e^{-\frac{i d (2 a+b x)}{b}}\left(1+e^{\frac{2 i a d}{b}}\right)\left(b+b\, e^{\frac{2 i d (a+b x)}{b}}+i d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[\right.\right.\right.$$
$$\left.\left.-\frac{i d (a+b x)}{b}\right]-i d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[\frac{i d (a+b x)}{b}\right]\right)-\frac{1}{4 b^2 (a+b x)}$$
$$e^{-\frac{i d (2 a+b x)}{b}}\left(-1+e^{\frac{2 i a d}{b}}\right)\left(b-b\, e^{\frac{2 i d (a+b x)}{b}}+i d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[-\frac{i d (a+b x)}{b}\right]+\right.$$
$$\left.\left.\left.i d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[\frac{i d (a+b x)}{b}\right]\right)\right)\text{Sin}[c]\right)-$$
$$\frac{1}{4 a^3}\, i \left(4 i b^2+a b d\right)\left(\text{Cos}[c]\left(\frac{1}{4 b^2 (a+b x)} e^{-\frac{i d (2 a+b x)}{b}}\left(1+e^{\frac{2 i a d}{b}}\right)\right.\right.$$
$$\left(i b\left(-1+e^{\frac{2 i d (a+b x)}{b}}\right)+d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[-\frac{i d (a+b x)}{b}\right]+\right.$$
$$\left.d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\,\text{ExpIntegralEi}\left[\frac{i d (a+b x)}{b}\right]\right)+\frac{1}{4 b^2 (a+b x)}$$

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

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

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

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

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

$$\left.\left. i d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\, \text{ExpIntegralEi}\left[\frac{i d (a+b x)}{b}\right]\right)\right) \text{Sin}[c]\Bigg) +$$

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

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

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

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

$$\left.\left. i d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\, \text{ExpIntegralEi}\left[\frac{i d (a+b x)}{b}\right]\right)\right) -$$

$$\left(\frac{1}{4 b^2 (a+b x)} e^{-\frac{i d (2 a+b x)}{b}} \left(1+e^{\frac{2 i a d}{b}}\right) \left(i b \left(-1+e^{\frac{2 i d (a+b x)}{b}}\right) + d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\right.\right.$$

$$\left. \text{ExpIntegralEi}\left[-\frac{i d (a+b x)}{b}\right] + d\, e^{\frac{i d (a+b x)}{b}} (a+b x)\, \text{ExpIntegralEi}\left[\frac{i d (a+b x)}{b}\right]\right) +$$

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

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

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

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

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

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

$$\left.\left.\mathrm{i}\, d\, e^{\frac{\mathrm{i}\, d\,(a+b\,x)}{b}}\,(a+b\,x)\,\mathrm{ExpIntegralEi}\left[\frac{\mathrm{i}\, d\,(a+b\,x)}{b}\right]\right)\right)-$$

$$\left(\frac{1}{4\,b^2\,(a+b\,x)}e^{-\frac{\mathrm{i}\,d\,(2\,a+b\,x)}{b}}\left(1+e^{\frac{2\,\mathrm{i}\,a\,d}{b}}\right)\left(\mathrm{i}\,b\left(-1+e^{\frac{2\,\mathrm{i}\,d\,(a+b\,x)}{b}}\right)+d\,e^{\frac{\mathrm{i}\,d\,(a+b\,x)}{b}}\,(a+b\,x)\right.\right.$$

$$\left.\mathrm{ExpIntegralEi}\left[-\frac{\mathrm{i}\,d\,(a+b\,x)}{b}\right]+d\,e^{\frac{\mathrm{i}\,d\,(a+b\,x)}{b}}\,(a+b\,x)\,\mathrm{ExpIntegralEi}\left[\frac{\mathrm{i}\,d\,(a+b\,x)}{b}\right]\right)+$$

$$\frac{1}{4\,b^2\,(a+b\,x)}e^{-\frac{\mathrm{i}\,d\,(2\,a+b\,x)}{b}}\left(-1+e^{\frac{2\,\mathrm{i}\,a\,d}{b}}\right)\left(d\,e^{\frac{\mathrm{i}\,d\,(a+b\,x)}{b}}\,(a+b\,x)\,\mathrm{ExpIntegralEi}\left[-\frac{\mathrm{i}\,d\,(a+b\,x)}{b}\right]-\right.$$

$$\left.\left.\left.\mathrm{i}\left(b+b\,e^{\frac{2\,\mathrm{i}\,d\,(a+b\,x)}{b}}-\mathrm{i}\,d\,e^{\frac{\mathrm{i}\,d\,(a+b\,x)}{b}}\,(a+b\,x)\,\mathrm{ExpIntegralEi}\left[\frac{\mathrm{i}\,d\,(a+b\,x)}{b}\right]\right)\right)\right)\mathrm{Sin}[c]\right)-$$

$$\frac{\left(2\,a^2+5\,a\,b\,x+2\,b^2\,x^2\right)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{2\,a^3\,x\,(a+b\,x)^2}+\frac{1}{2\,a^4}$$

$$\left(2\;a\;d\;\mathrm{Cos}[c]\;\mathrm{CosIntegral}[d\,x]-6\,b\,\mathrm{CosIntegral}[d\,x]\,\mathrm{Sin}[c]+6\,b\;\mathrm{CosIntegral}\left[\frac{a\,d}{b}+d\,x\right]\right.$$

$$\mathrm{Sin}\left[c-\frac{a\,d}{b}\right]-6\,b\,\mathrm{Cos}[c]\,\mathrm{SinIntegral}[d\,x]-2\;a\;d\;\mathrm{Sin}[c]\;\mathrm{SinIntegral}[d\,x]+6\;b$$

$$\left.\mathrm{Cos}\left[c-\frac{a\,d}{b}\right]\;\mathrm{SinIntegral}\left[\frac{a\,d}{b}+d\,x\right]\right)$$

Problem 57: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^4\,\mathrm{Sin}[c+d\,x]}{a+b\,x^2}\,dx$$

Optimal (type 4, 273 leaves, 14 steps):

$$\frac{2\,\text{Cos}[c+d\,x]}{b\,d^3}+\frac{a\,\text{Cos}[c+d\,x]}{b^2\,d}-\frac{x^2\,\text{Cos}[c+d\,x]}{b\,d}-\frac{(-a)^{3/2}\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{2\,b^{5/2}}+$$
$$\frac{(-a)^{3/2}\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\,\text{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{2\,b^{5/2}}+$$
$$\frac{2\,x\,\text{Sin}[c+d\,x]}{b\,d^2}-\frac{(-a)^{3/2}\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^{5/2}}-$$
$$\frac{(-a)^{3/2}\,\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^{5/2}}$$

Result (type 4, 275 leaves):

$$\frac{1}{2\,b^{5/2}\,d^3}\left(4\,b^{3/2}\,\text{Cos}[c+d\,x]+2\,a\,\sqrt{b}\,d^2\,\text{Cos}[c+d\,x]-\right.$$
$$2\,b^{3/2}\,d^2\,x^2\,\text{Cos}[c+d\,x]+i\,a^{3/2}\,d^3\,\text{CosIntegral}\left[d\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sin}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]-$$
$$i\,a^{3/2}\,d^3\,\text{CosIntegral}\left[d\left(-\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sin}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]+$$
$$4\,b^{3/2}\,d\,x\,\text{Sin}[c+d\,x]+i\,a^{3/2}\,d^3\,\text{Cos}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[d\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$
$$\left.i\,a^{3/2}\,d^3\,\text{Cos}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)$$

Problem 58: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 209 leaves, 12 steps):

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

Result (type 4, 202 leaves):

$$-\frac{1}{2 b^2 d^2}\left(2 b d x \text{Cos}[c+d x]+a d^2 \text{CosIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right] \text{Sin}\left[c-\frac{i \sqrt{a} d}{\sqrt{b}}\right]+a d^2 \text{CosIntegral}\left[d\left(-\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right] \text{Sin}\left[c+\frac{i \sqrt{a} d}{\sqrt{b}}\right]-2 b \text{Sin}[c+d x]+a d^2 \text{Cos}\left[c-\frac{i \sqrt{a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]-a d^2 \text{Cos}\left[c+\frac{i \sqrt{a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{i \sqrt{a} d}{\sqrt{b}}-d x\right]\right)$$

Problem 59: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 227 leaves, 11 steps):

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

Result (type 4, 216 leaves):

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

Problem 60: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 177 leaves, 8 steps):

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

Result (type 4, 163 leaves):

$$\frac{1}{2\,b}\left(\text{CosIntegral}\left[d\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sin}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]+\text{CosIntegral}\left[d\left(-\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sin}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]+\text{Cos}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[d\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]-\text{Cos}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)$$

Problem 61: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 213 leaves, 8 steps):

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

Result (type 4, 172 leaves):

$$\frac{1}{2\,\sqrt{a}\,\sqrt{b}}\,i\left(\text{CosIntegral}\left[d\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sin}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]-\text{CosIntegral}\left[d\left(-\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sin}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]+\text{Cos}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[d\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{Cos}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)$$

Problem 62: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 197 leaves, 13 steps):

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

Result (type 4, 179 leaves):

$$-\frac{1}{2 a}\left(-2 \text{CosIntegral}[d x] \text{Sin}[c] + \text{CosIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] \text{Sin}\left[c - \frac{i \sqrt{a} d}{\sqrt{b}}\right] + \text{CosIntegral}\left[d\left(-\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] \text{Sin}\left[c + \frac{i \sqrt{a} d}{\sqrt{b}}\right] - 2 \text{Cos}[c] \text{SinIntegral}[d x] + \text{Cos}\left[c - \frac{i \sqrt{a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] - \text{Cos}\left[c + \frac{i \sqrt{a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{i \sqrt{a} d}{\sqrt{b}} - d x\right]\right)$$

Problem 63: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 250 leaves, 14 steps):

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

Result (type 4, 238 leaves):

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

Problem 64: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 270 leaves, 18 steps):

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

Result (type 4, 247 leaves):

$$-\frac{1}{2 a^2 x^2}\left(a d x \,\text{Cos}[c+d x]+\left(2 b+a d^2\right) x^2 \,\text{CosIntegral}[d x] \,\text{Sin}[c]-b x^2 \,\text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right] \text{Sin}\left[c-\frac{i \sqrt{a} d}{\sqrt{b}}\right]-b x^2 \,\text{CosIntegral}\left[d \left(-\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right] \text{Sin}\left[c+\frac{i \sqrt{a} d}{\sqrt{b}}\right]+a \,\text{Sin}[c+d x]+2 b x^2 \,\text{Cos}[c] \,\text{SinIntegral}[d x]+a d^2 x^2 \,\text{Cos}[c] \,\text{SinIntegral}[d x]-b x^2 \,\text{Cos}\left[c-\frac{i \sqrt{a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]+b x^2 \,\text{Cos}\left[c+\frac{i \sqrt{a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{i \sqrt{a} d}{\sqrt{b}}-d x\right]\right)$$

Problem 65: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 450 leaves, 24 steps):

$$-\frac{\text{Cos}[c+d x]}{b^2 d}-\frac{a d \,\text{Cos}\left[c+\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}-d x\right]}{4 b^3}-\frac{a d \,\text{Cos}\left[c-\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}+d x\right]}{4 b^3}-\frac{3 \sqrt{-a}\, \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}+d x\right] \text{Sin}\left[c-\frac{\sqrt{-a}\, d}{\sqrt{b}}\right]}{4 b^{5/2}}+\frac{3 \sqrt{-a}\, \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}-d x\right] \text{Sin}\left[c+\frac{\sqrt{-a}\, d}{\sqrt{b}}\right]}{4 b^{5/2}}+\frac{x \,\text{Sin}[c+d x]}{2 b^2}-\frac{x^3 \,\text{Sin}[c+d x]}{2 b \left(a+b x^2\right)}-\frac{3 \sqrt{-a}\, \text{Cos}\left[c+\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}-d x\right]}{4 b^{5/2}}-\frac{a d \,\text{Sin}\left[c+\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}-d x\right]}{4 b^3}-\frac{3 \sqrt{-a}\, \text{Cos}\left[c-\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}+d x\right]}{4 b^{5/2}}+\frac{a d \,\text{Sin}\left[c-\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}+d x\right]}{4 b^3}$$

Result (type 4, 632 leaves) :

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

Problem 66: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 431 leaves, 20 steps) :

$$\frac{\sqrt{-a}\ d\,\text{Cos}\left[c+\frac{\sqrt{-a}\ d}{\sqrt{b}}\right]\text{CosIntegral}\left[\frac{\sqrt{-a}\ d}{\sqrt{b}}-d\,x\right]}{4\,b^{5/2}}-\frac{\sqrt{-a}\ d\,\text{Cos}\left[c-\frac{\sqrt{-a}\ d}{\sqrt{b}}\right]\text{CosIntegral}\left[\frac{\sqrt{-a}\ d}{\sqrt{b}}+d\,x\right]}{4\,b^{5/2}}+\frac{\text{CosIntegral}\left[\frac{\sqrt{-a}\ d}{\sqrt{b}}+d\,x\right]\text{Sin}\left[c-\frac{\sqrt{-a}\ d}{\sqrt{b}}\right]}{2\,b^2}+$$

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

$$\frac{\text{Cos}\left[c+\frac{\sqrt{-a}\ d}{\sqrt{b}}\right]\text{SinIntegral}\left[\frac{\sqrt{-a}\ d}{\sqrt{b}}-d\,x\right]}{2\,b^2}+\frac{\sqrt{-a}\ d\,\text{Sin}\left[c+\frac{\sqrt{-a}\ d}{\sqrt{b}}\right]\text{SinIntegral}\left[\frac{\sqrt{-a}\ d}{\sqrt{b}}-d\,x\right]}{4\,b^{5/2}}+$$

$$\frac{\text{Cos}\left[c-\frac{\sqrt{-a}\ d}{\sqrt{b}}\right]\text{SinIntegral}\left[\frac{\sqrt{-a}\ d}{\sqrt{b}}+d\,x\right]}{2\,b^2}+\frac{\sqrt{-a}\ d\,\text{Sin}\left[c-\frac{\sqrt{-a}\ d}{\sqrt{b}}\right]\text{SinIntegral}\left[\frac{\sqrt{-a}\ d}{\sqrt{b}}+d\,x\right]}{4\,b^{5/2}}$$

Result (type 4, 583 leaves):

$$\frac{1}{4\,b^{5/2}\left(a+b\,x^2\right)}$$

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

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

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

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

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

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

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

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

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

$$i\sqrt{a}\ b\,d\,x^2\,\text{Sin}\left[c+\frac{i\sqrt{a}\ d}{\sqrt{b}}\right]\text{SinIntegral}\left[\frac{i\sqrt{a}\ d}{\sqrt{b}}-d\,x\right]\Bigg)$$

Problem 67: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 416 leaves, 17 steps):

$$\frac{d \operatorname{Cos}\left[c+\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \operatorname{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}-d x\right]}{4 b^2}+\frac{d \operatorname{Cos}\left[c-\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \operatorname{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}+d x\right]}{4 b^2}-\frac{\operatorname{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}+d x\right] \operatorname{Sin}\left[c-\frac{\sqrt{-a}\, d}{\sqrt{b}}\right]}{4 \sqrt{-a}\, b^{3/2}}+\frac{\operatorname{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}-d x\right] \operatorname{Sin}\left[c+\frac{\sqrt{-a}\, d}{\sqrt{b}}\right]}{4 \sqrt{-a}\, b^{3/2}}-\frac{x \operatorname{Sin}[c+d x]}{2 b \left(a+b x^2\right)}-\frac{\operatorname{Cos}\left[c+\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}-d x\right]}{4 \sqrt{-a}\, b^{3/2}}+\frac{d \operatorname{Sin}\left[c+\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}-d x\right]}{4 b^2}-\frac{\operatorname{Cos}\left[c-\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}+d x\right]}{4 \sqrt{-a}\, b^{3/2}}-\frac{d \operatorname{Sin}\left[c-\frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}}+d x\right]}{4 b^2}$$

Result (type 4, 583 leaves):

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

Problem 68: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 239 leaves, 9 steps):

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

Result (type 4, 309 leaves):

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

Problem 69: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 476 leaves, 18 steps):

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

Result (type 4, 585 leaves):

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

Problem 70: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 435 leaves, 22 steps):

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

Result (type 4, 650 leaves):

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

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

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

$$2 a \sqrt{b}\, \text{Sin}[c+d x]+4 a \sqrt{b}\, \text{Cos}[c]\, \text{SinIntegral}[d x]+$$

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

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

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

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

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

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

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

$$i \sqrt{a}\, b\, d\, x^2\, \text{Sin}\left[c+\frac{i \sqrt{a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}}-d x\right]\Bigg)$$

Problem 71: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 501 leaves, 32 steps):

$$\frac{d\,\mathrm{Cos}[c]\,\mathrm{CosIntegral}[d\,x]}{a^2}+\frac{d\,\mathrm{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\mathrm{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,a^2}+$$

$$\frac{d\,\mathrm{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\mathrm{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,a^2}+\frac{3\,\sqrt{b}\,\mathrm{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\mathrm{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,(-a)^{5/2}}-$$

$$\frac{3\,\sqrt{b}\,\mathrm{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\mathrm{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,(-a)^{5/2}}-\frac{\mathrm{Sin}[c+d\,x]}{a^2\,x}+$$

$$\frac{\sqrt{b}\,\mathrm{Sin}[c+d\,x]}{4\,a^2\left(\sqrt{-a}-\sqrt{b}\,x\right)}-\frac{\sqrt{b}\,\mathrm{Sin}[c+d\,x]}{4\,a^2\left(\sqrt{-a}+\sqrt{b}\,x\right)}-\frac{d\,\mathrm{Sin}[c]\,\mathrm{SinIntegral}[d\,x]}{a^2}+$$

$$\frac{3\,\sqrt{b}\,\mathrm{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\mathrm{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,(-a)^{5/2}}+\frac{d\,\mathrm{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\mathrm{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,a^2}+$$

$$\frac{3\,\sqrt{b}\,\mathrm{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\mathrm{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,(-a)^{5/2}}-\frac{d\,\mathrm{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\mathrm{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,a^2}$$

Result (type 4, 768 leaves) :

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

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

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

$$3\,i\,a\,\sqrt{b}\,x\,\text{CosIntegral}\left[d\,\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sin}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]-$$

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

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

$$4\,a^{3/2}\,\text{Sin}[c+d\,x]-6\,\sqrt{a}\,b\,x^2\,\text{Sin}[c+d\,x]-4\,a^{3/2}\,d\,x\,\text{Sin}[c]\,\text{SinIntegral}[d\,x]-$$

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

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

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

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

$$3\,i\,a\,\sqrt{b}\,x\,\text{Cos}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$

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

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

$$\left.\sqrt{a}\,b\,d\,x^3\,\text{Sin}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)$$

Problem 72: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 476 leaves, 27 steps):

$$-\frac{d\,x\,\text{Cos}[c+d\,x]}{8\,b^2\,\left(a+b\,x^2\right)}+\frac{3\,d\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,\sqrt{-a}\,b^{5/2}}-$$

$$\frac{3\,d\,\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,\sqrt{-a}\,b^{5/2}}-\frac{d^2\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,b^3}-$$

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

$$\frac{d^2\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,b^3}+\frac{3\,d\,\text{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,\sqrt{-a}\,b^{5/2}}-$$

$$\frac{d^2\,\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,b^3}+\frac{3\,d\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,\sqrt{-a}\,b^{5/2}}$$

Result (type 4, 647 leaves):

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

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

$$\left(-\text{i}\,\text{CosIntegral}\left[d\,\left(-\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\text{i}\,\text{CosIntegral}\left[d\,\left(\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\right.$$

$$\left.\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\left(-\text{SinIntegral}\left[d\,\left(\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{SinIntegral}\left[\frac{\text{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)+$$

$$\frac{1}{\sqrt{a}\,\sqrt{b}}3\,d\,\text{Cos}[c]\,\left(-\text{i}\,\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[d\,\left(-\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\right.$$

$$\text{i}\,\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[d\,\left(\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]$$

$$\left.\left(-\text{SinIntegral}\left[d\,\left(\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{SinIntegral}\left[\frac{\text{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)-\frac{1}{\sqrt{a}\,\sqrt{b}}3\,d\,\text{Sin}[c]$$

$$\left(\text{CosIntegral}\left[d\,\left(-\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\text{CosIntegral}\left[d\,\left(\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\right.$$

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

$$\left(\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[d\,\left(-\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[d\,\left(\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\right.$$

$$\left.\left.\text{i}\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\left(\text{SinIntegral}\left[d\,\left(\frac{\text{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{SinIntegral}\left[\frac{\text{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)\right)$$

Problem 73: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 746 leaves, 28 steps):

$$-\frac{d \operatorname{Cos}[c+d x]}{8 b^2 \left(a+b x^2\right)}-\frac{d \operatorname{Cos}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \operatorname{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 a b^2}-\frac{d \operatorname{Cos}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \operatorname{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 a b^2}+\frac{\operatorname{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right] \operatorname{Sin}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 (-a)^{3/2} b^{3/2}}+\frac{d^2 \operatorname{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right] \operatorname{Sin}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 \sqrt{-a} b^{5/2}}-\frac{\operatorname{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right] \operatorname{Sin}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 (-a)^{3/2} b^{3/2}}-\frac{d^2 \operatorname{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right] \operatorname{Sin}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 \sqrt{-a} b^{5/2}}-\frac{\operatorname{Sin}[c+d x]}{16 a b^{3/2} \left(\sqrt{-a}-\sqrt{b} x\right)}+\frac{\operatorname{Sin}[c+d x]}{16 a b^{3/2} \left(\sqrt{-a}+\sqrt{b} x\right)}-\frac{x \operatorname{Sin}[c+d x]}{4 b \left(a+b x^2\right)^2}+\frac{\operatorname{Cos}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 (-a)^{3/2} b^{3/2}}+\frac{d^2 \operatorname{Cos}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 \sqrt{-a} b^{5/2}}-\frac{d \operatorname{Sin}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 a b^2}+\frac{\operatorname{Cos}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 (-a)^{3/2} b^{3/2}}+\frac{d^2 \operatorname{Cos}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 \sqrt{-a} b^{5/2}}+\frac{d \operatorname{Sin}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 a b^2}$$

Result (type 4, 927 leaves):

$$\frac{1}{16 a^{3/2} b^2}\left(-\frac{2 a^{5/2} d \operatorname{Cos}[c] \operatorname{Cos}[d x]}{\left(a+b x^2\right)^2}-\frac{2 a^{3/2} b d x^2 \operatorname{Cos}[c] \operatorname{Cos}[d x]}{\left(a+b x^2\right)^2}-\frac{2 a^{3/2} b x \operatorname{Cos}[d x] \operatorname{Sin}[c]}{\left(a+b x^2\right)^2}+\frac{2 \sqrt{a} b^2 x^3 \operatorname{Cos}[d x] \operatorname{Sin}[c]}{\left(a+b x^2\right)^2}+\frac{1}{\sqrt{b}} \operatorname{CosIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]\left(-\sqrt{a} \sqrt{b} d \operatorname{Cos}\left[c-\frac{i \sqrt{a} d}{\sqrt{b}}\right]+i \left(b-a d^2\right) \operatorname{Sin}\left[c-\frac{i \sqrt{a} d}{\sqrt{b}}\right]\right)+\frac{1}{\sqrt{b}} i \operatorname{CosIntegral}\left[d\left(-\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]\left(i \sqrt{a} \sqrt{b} d \operatorname{Cos}\left[c+\frac{i \sqrt{a} d}{\sqrt{b}}\right]+\left(-b+a d^2\right) \operatorname{Sin}\left[c+\frac{i \sqrt{a} d}{\sqrt{b}}\right]\right)-\right.$$

$$\frac{2 a^{3/2} b x \operatorname{Cos}[c] \operatorname{Sin}[d x]}{\left(a+b x^2\right)^2}+\frac{2 \sqrt{a}\, b^2 x^3 \operatorname{Cos}[c] \operatorname{Sin}[d x]}{\left(a+b x^2\right)^2}+\frac{2 a^{5/2} d \operatorname{Sin}[c] \operatorname{Sin}[d x]}{\left(a+b x^2\right)^2}+$$

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

$$\frac{i a d^2 \operatorname{Cos}[c] \operatorname{Cosh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]}{\sqrt{b}}+$$

$$\sqrt{a}\, d \operatorname{Cosh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{Sin}[c] \operatorname{SinIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]-$$

$$i \sqrt{a}\, d \operatorname{Cos}[c] \operatorname{Sinh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]-$$

$$\sqrt{b} \operatorname{Sin}[c] \operatorname{Sinh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]+$$

$$\frac{a d^2 \operatorname{Sin}[c] \operatorname{Sinh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]}{\sqrt{b}}+$$

$$i \sqrt{b} \operatorname{Cos}[c] \operatorname{Cosh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}}-d x\right]-$$

$$\frac{i a d^2 \operatorname{Cos}[c] \operatorname{Cosh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}}-d x\right]}{\sqrt{b}}-$$

$$\sqrt{a}\, d \operatorname{Cosh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{Sin}[c] \operatorname{SinIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}}-d x\right]-$$

$$i \sqrt{a}\, d \operatorname{Cos}[c] \operatorname{Sinh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}}-d x\right]+$$

$$\sqrt{b} \operatorname{Sin}[c] \operatorname{Sinh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}}-d x\right]-$$

$$\left.\frac{a d^2 \operatorname{Sin}[c] \operatorname{Sinh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}}-d x\right]}{\sqrt{b}}\right)$$

Problem 74: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 512 leaves, 19 steps):

$$-\frac{d\,\text{Cos}[c+d\,x]}{16\,a\,b^{3/2}\left(\sqrt{-a}-\sqrt{b}\,x\right)}+\frac{d\,\text{Cos}[c+d\,x]}{16\,a\,b^{3/2}\left(\sqrt{-a}+\sqrt{b}\,x\right)}-\frac{d\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,(-a)^{3/2}\,b^{3/2}}+$$

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

$$\frac{d^2\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\text{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,a\,b^2}-\frac{\text{Sin}[c+d\,x]}{4\,b\left(a+b\,x^2\right)^2}-$$

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

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

Result (type 4, 634 leaves):

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

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

$$\left.\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[d\left(\frac{\text{i}\sqrt{a}}{\sqrt{b}}+x\right)\right]-\text{SinIntegral}\left[\frac{\text{i}\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)+$$

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

$$\text{i}\,\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(\frac{\text{i}\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]$$

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

$$\left(\text{CosIntegral}\left[d\left(-\frac{\text{i}\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\text{CosIntegral}\left[d\left(\frac{\text{i}\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\right.$$

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

$$\left(\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(-\frac{\text{i}\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(\frac{\text{i}\sqrt{a}}{\sqrt{b}}+x\right)\right]+\right.$$

$$\left.\left.\text{i}\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[d\left(\frac{\text{i}\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{SinIntegral}\left[\frac{\text{i}\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)\right)$$

Problem 75: Result unnecessarily involves imaginary or complex numbers.

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

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

$$\frac{d \text{Cos}[c+d x]}{16 (-a)^{3/2} b \left(\sqrt{-a}-\sqrt{b} x\right)}+\frac{d \text{Cos}[c+d x]}{16 (-a)^{3/2} b \left(\sqrt{-a}+\sqrt{b} x\right)}-\frac{3 d \text{Cos}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 a^2 b}-\frac{3 d \text{Cos}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 a^2 b}-\frac{3 \text{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right] \text{Sin}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 (-a)^{5/2} \sqrt{b}}+\frac{d^2 \text{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right] \text{Sin}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 (-a)^{3/2} b^{3/2}}+\frac{3 \text{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right] \text{Sin}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 (-a)^{5/2} \sqrt{b}}-\frac{d^2 \text{CosIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right] \text{Sin}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 (-a)^{3/2} b^{3/2}}-\frac{\text{Sin}[c+d x]}{16 (-a)^{3/2} \sqrt{b} \left(\sqrt{-a}-\sqrt{b} x\right)^2}-\frac{3 \text{Sin}[c+d x]}{16 a^2 \sqrt{b} \left(\sqrt{-a}-\sqrt{b} x\right)}+\frac{\text{Sin}[c+d x]}{16 (-a)^{3/2} \sqrt{b} \left(\sqrt{-a}+\sqrt{b} x\right)^2}+\frac{3 \text{Sin}[c+d x]}{16 a^2 \sqrt{b} \left(\sqrt{-a}+\sqrt{b} x\right)}-\frac{3 \text{Cos}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 (-a)^{5/2} \sqrt{b}}+\frac{d^2 \text{Cos}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 (-a)^{3/2} b^{3/2}}-\frac{3 d \text{Sin}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 a^2 b}-\frac{3 \text{Cos}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 (-a)^{5/2} \sqrt{b}}+\frac{d^2 \text{Cos}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 (-a)^{3/2} b^{3/2}}+\frac{3 d \text{Sin}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 a^2 b}$$

Result (type 4, 932 leaves):

$$\frac{1}{16 a^2 b^{3/2}}\left(\frac{2 a^2 \sqrt{b} d \text{Cos}[c] \text{Cos}[d x]}{\left(a+b x^2\right)^2}+\frac{2 a b^{3/2} d x^2 \text{Cos}[c] \text{Cos}[d x]}{\left(a+b x^2\right)^2}+\frac{10 a b^{3/2} x \text{Cos}[d x] \text{Sin}[c]}{\left(a+b x^2\right)^2}+\frac{6 b^{5/2} x^3 \text{Cos}[d x] \text{Sin}[c]}{\left(a+b x^2\right)^2}+\frac{1}{\sqrt{a}} i \text{CosIntegral}\left[d\left(\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]\left(3 i \sqrt{a} \sqrt{b} d \text{Cos}\left[c-\frac{i \sqrt{a} d}{\sqrt{b}}\right]+\left(3 b+a d^2\right) \text{Sin}\left[c-\frac{i \sqrt{a} d}{\sqrt{b}}\right]\right)-\frac{1}{\sqrt{a}} i \text{CosIntegral}\left[d\left(-\frac{i \sqrt{a}}{\sqrt{b}}+x\right)\right]\right.$$

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

$$\frac{10\,a\,b^{3/2}\,x\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{\left(a+b\,x^2\right)^2}+\frac{6\,b^{5/2}\,x^3\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{\left(a+b\,x^2\right)^2}-\frac{2\,a^2\,\sqrt{b}\,d\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x]}{\left(a+b\,x^2\right)^2}-$$

$$\frac{2\,a\,b^{3/2}\,d\,x^2\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x]}{\left(a+b\,x^2\right)^2}+\frac{3\,\mathrm{i}\,b\,\mathrm{Cos}[c]\,\mathrm{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[d\left(\frac{\mathrm{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]}{\sqrt{a}}+$$

$$\mathrm{i}\,\sqrt{a}\,d^2\,\mathrm{Cos}[c]\,\mathrm{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[d\left(\frac{\mathrm{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$

$$3\,\sqrt{b}\,d\,\mathrm{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{Sin}[c]\,\mathrm{SinIntegral}\left[d\left(\frac{\mathrm{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]-$$

$$3\,\mathrm{i}\,\sqrt{b}\,d\,\mathrm{Cos}[c]\,\mathrm{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[d\left(\frac{\mathrm{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]-$$

$$\frac{3\,b\,\mathrm{Sin}[c]\,\mathrm{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[d\left(\frac{\mathrm{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]}{\sqrt{a}}-$$

$$\sqrt{a}\,d^2\,\mathrm{Sin}[c]\,\mathrm{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[d\left(\frac{\mathrm{i}\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$

$$\frac{3\,\mathrm{i}\,b\,\mathrm{Cos}[c]\,\mathrm{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{\mathrm{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]}{\sqrt{a}}+$$

$$\mathrm{i}\,\sqrt{a}\,d^2\,\mathrm{Cos}[c]\,\mathrm{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{\mathrm{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$

$$3\,\sqrt{b}\,d\,\mathrm{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{Sin}[c]\,\mathrm{SinIntegral}\left[\frac{\mathrm{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$

$$3\,\mathrm{i}\,\sqrt{b}\,d\,\mathrm{Cos}[c]\,\mathrm{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{\mathrm{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$\frac{3\,b\,\mathrm{Sin}[c]\,\mathrm{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{\mathrm{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]}{\sqrt{a}}+$$

$$\left.\sqrt{a}\,d^2\,\mathrm{Sin}[c]\,\mathrm{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{\mathrm{i}\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)$$

Problem 76: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 730 leaves, 41 steps):

$$\frac{d\,\text{Cos}[c+d\,x]}{16\,a^2\,\sqrt{b}\,\left(\sqrt{-a}-\sqrt{b}\,x\right)}-\frac{d\,\text{Cos}[c+d\,x]}{16\,a^2\,\sqrt{b}\,\left(\sqrt{-a}+\sqrt{b}\,x\right)}-\frac{5\,d\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,(-a)^{5/2}\,\sqrt{b}}+$$

$$\frac{5\,d\,\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,(-a)^{5/2}\,\sqrt{b}}+\frac{\text{CosIntegral}[d\,x]\,\text{Sin}[c]}{a^3}-$$

$$\frac{\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{2\,a^3}-\frac{d^2\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,a^2\,b}-$$

$$\frac{\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\,\text{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{2\,a^3}-\frac{d^2\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\,\text{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,a^2\,b}+$$

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

$$\frac{\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,a^3}+\frac{d^2\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,a^2\,b}-$$

$$\frac{5\,d\,\text{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,(-a)^{5/2}\,\sqrt{b}}-\frac{\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,a^3}-$$

$$\frac{d^2\,\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,a^2\,b}-\frac{5\,d\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,(-a)^{5/2}\,\sqrt{b}}$$

Result (type 4, 1384 leaves):

$$\text{Cos}[c]\left(\frac{\text{SinIntegral}[d\,x]}{a^3}+\frac{1}{16\,a^2\,b}\right.$$

$$\left(\frac{\left(i\,\sqrt{a}\,\sqrt{b}\,d+b\,d\,x\right)\,\text{Cos}[d\,x]+b\,\text{Sin}[d\,x]}{\left(\sqrt{a}-i\,\sqrt{b}\,x\right)^2}+i\,d^2\,\text{CosIntegral}\left[d\,\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]-\right.$$

$$\left.\left.d^2\,\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[d\,\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\right)-\frac{1}{16\,a^{5/2}}\right.$$

$$5\,i\,\sqrt{b}\,\left(-\frac{\text{Sin}[d\,x]}{i\,\sqrt{a}\,\sqrt{b}+b\,x}+\frac{1}{b}d\,\left(\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[d\,\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+\right.\right.$$

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

$$\left(i\,\text{CosIntegral}\left[-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}+d\,x\right]\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]-\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\,\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)+$$

$$\frac{1}{16\,a^2\,b}\left(\frac{\left(-i\,\sqrt{a}\,\sqrt{b}\,d+b\,d\,x\right)\,\text{Cos}[d\,x]+b\,\text{Sin}[d\,x]}{\left(\sqrt{a}+i\,\sqrt{b}\,x\right)^2}-i\,d^2\,\text{CosIntegral}\left[d\,\left(-\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]\right.$$

$$\text{Sinh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right] + d^2\,\text{Cosh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\sqrt{a}\ d}{\sqrt{b}} - d\,x\right]\Bigg) + \frac{1}{16\,a^{5/2}}$$

$$5\,i\,\sqrt{b}\,\left(-\frac{\text{Sin}[d\,x]}{-i\sqrt{a}\ \sqrt{b} + b\,x} + \frac{1}{b}d\left(\text{Cosh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}} + x\right)\right] + \right.\right.$$

$$\left.\left. i\,\text{Sinh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\sqrt{a}\ d}{\sqrt{b}} - d\,x\right]\right)\right) - \frac{1}{2\,a^3}$$

$$\left(-i\,\text{CosIntegral}\left[\frac{i\sqrt{a}\ d}{\sqrt{b}} + d\,x\right]\,\text{Sinh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right] + \text{Cosh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\sqrt{a}\ d}{\sqrt{b}} + d\,x\right]\right)\Bigg) +$$

$$\text{Sin}[c]\,\left(\frac{\text{CosIntegral}[d\,x]}{a^3} + \frac{1}{16\,a^2\,b}\right.$$

$$\left(-d^2\,\text{Cosh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}} + x\right)\right] + \frac{b\,\text{Cos}[d\,x] + \left(-i\sqrt{a}\ \sqrt{b}\ d - b\,d\,x\right)\,\text{Sin}[d\,x]}{\left(\sqrt{a} - i\sqrt{b}\ x\right)^2} - \right.$$

$$\left. i\,d^2\,\text{Sinh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}} + x\right)\right]\right) - \frac{1}{16\,a^{5/2}}$$

$$5\,i\,\sqrt{b}\,\left(-\frac{\text{Cos}[d\,x]}{i\sqrt{a}\ \sqrt{b} + b\,x} + \frac{1}{b}i\,d\left(\text{CosIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}} + x\right)\right]\,\text{Sinh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right] + \right.\right.$$

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

$$\left(\text{Cosh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[-\frac{i\sqrt{a}\ d}{\sqrt{b}} + d\,x\right] + i\,\text{Sinh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\sqrt{a}\ d}{\sqrt{b}} - d\,x\right]\right) +$$

$$\frac{1}{16\,a^2\,b}\left(-d^2\,\text{Cosh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}} + x\right)\right] + \right.$$

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

$$\left. i\,d^2\,\text{Sinh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\sqrt{a}\ d}{\sqrt{b}} - d\,x\right]\right) + \frac{1}{16\,a^{5/2}}$$

$$5\,i\,\sqrt{b}\,\left(-\frac{\text{Cos}[d\,x]}{-i\sqrt{a}\ \sqrt{b} + b\,x} - \frac{1}{b}d\left(i\,\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}} + x\right)\right]\,\text{Sinh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right] - \right.\right.$$

$$\left.\left. \text{Cosh}\left[\frac{\sqrt{a}\ d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{i\sqrt{a}\ d}{\sqrt{b}} - d\,x\right]\right)\right) - \frac{1}{2\,a^3}$$

$$\left(\text{Cosh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \text{CosIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}} + d\, x\right] + i\, \text{Sinh}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{i \sqrt{a}\, d}{\sqrt{b}} + d\, x\right]\right)\Bigg)$$

Problem 77: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 875 leaves, 60 steps):

$$\frac{d\, \text{Cos}[c + d\, x]}{16 \,(-a)^{5/2} \left(\sqrt{-a} - \sqrt{b}\, x\right)} + \frac{d\, \text{Cos}[c + d\, x]}{16 \,(-a)^{5/2} \left(\sqrt{-a} + \sqrt{b}\, x\right)} + \frac{d\, \text{Cos}[c]\, \text{CosIntegral}[d\, x]}{a^3} +$$
$$\frac{7\, d\, \text{Cos}\left[c + \frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} - d\, x\right]}{16\, a^3} + \frac{7\, d\, \text{Cos}\left[c - \frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} + d\, x\right]}{16\, a^3} -$$
$$\frac{15 \sqrt{b}\, \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} + d\, x\right] \text{Sin}\left[c - \frac{\sqrt{-a}\, d}{\sqrt{b}}\right]}{16\, (-a)^{7/2}} + \frac{d^2\, \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} + d\, x\right] \text{Sin}\left[c - \frac{\sqrt{-a}\, d}{\sqrt{b}}\right]}{16\, (-a)^{5/2} \sqrt{b}} +$$
$$\frac{15 \sqrt{b}\, \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} - d\, x\right] \text{Sin}\left[c + \frac{\sqrt{-a}\, d}{\sqrt{b}}\right]}{16\, (-a)^{7/2}} - \frac{d^2\, \text{CosIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} - d\, x\right] \text{Sin}\left[c + \frac{\sqrt{-a}\, d}{\sqrt{b}}\right]}{16\, (-a)^{5/2} \sqrt{b}} -$$
$$\frac{\text{Sin}[c + d\, x]}{a^3\, x} - \frac{\sqrt{b}\, \text{Sin}[c + d\, x]}{16\, (-a)^{5/2} \left(\sqrt{-a} - \sqrt{b}\, x\right)^2} + \frac{7 \sqrt{b}\, \text{Sin}[c + d\, x]}{16\, a^3 \left(\sqrt{-a} - \sqrt{b}\, x\right)} +$$
$$\frac{\sqrt{b}\, \text{Sin}[c + d\, x]}{16\, (-a)^{5/2} \left(\sqrt{-a} + \sqrt{b}\, x\right)^2} - \frac{7 \sqrt{b}\, \text{Sin}[c + d\, x]}{16\, a^3 \left(\sqrt{-a} + \sqrt{b}\, x\right)} - \frac{d\, \text{Sin}[c]\, \text{SinIntegral}[d\, x]}{a^3} -$$
$$\frac{15 \sqrt{b}\, \text{Cos}\left[c + \frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} - d\, x\right]}{16\, (-a)^{7/2}} + \frac{d^2\, \text{Cos}\left[c + \frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} - d\, x\right]}{16\, (-a)^{5/2} \sqrt{b}} +$$
$$\frac{7\, d\, \text{Sin}\left[c + \frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} - d\, x\right]}{16\, a^3} - \frac{15 \sqrt{b}\, \text{Cos}\left[c - \frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} + d\, x\right]}{16\, (-a)^{7/2}} +$$
$$\frac{d^2\, \text{Cos}\left[c - \frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} + d\, x\right]}{16\, (-a)^{5/2} \sqrt{b}} - \frac{7\, d\, \text{Sin}\left[c - \frac{\sqrt{-a}\, d}{\sqrt{b}}\right] \text{SinIntegral}\left[\frac{\sqrt{-a}\, d}{\sqrt{b}} + d\, x\right]}{16\, a^3}$$

Result (type 4, 1673 leaves):

$$-\frac{1}{16\, a^{7/2} \sqrt{b}\, x \left(a + b\, x^2\right)^2}$$
$$i \Bigg(-2\, i\, a^{5/2} \sqrt{b}\, d\, x\, \text{Cos}[c + d\, x] - 2\, i\, a^{3/2}\, b^{3/2}\, d\, x^3\, \text{Cos}[c + d\, x] + 16\, i \sqrt{a} \sqrt{b}\, d\, x \left(a + b\, x^2\right)^2 \text{Cos}[c]$$
$$\text{CosIntegral}[d\, x] + 7\, i\, a^{5/2} \sqrt{b}\, d\, x\, \text{Cos}\left[c - \frac{i \sqrt{a}\, d}{\sqrt{b}}\right] \text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] +$$

$$14\, i\, a^{3/2}\, b^{3/2}\, d\, x^3 \,\text{Cos}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] +$$
$$7\, i \sqrt{a}\; b^{5/2}\, d\, x^5 \,\text{Cos}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] +$$
$$15\, a^2\, b\, x \,\text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] \text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] +$$
$$a^3\, d^2\, x \,\text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] \text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] + 30\, a\, b^2\, x^3 \,\text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right]$$
$$\text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] + 2\, a^2\, b\, d^2\, x^3 \,\text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] \text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] +$$
$$15\, b^3\, x^5 \,\text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] \text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] + a\, b^2\, d^2\, x^5$$
$$\text{CosIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] \text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] - x \left(a + b\, x^2\right)^2 \text{CosIntegral}\left[d \left(-\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right]$$
$$\left(-7\, i \sqrt{a}\; \sqrt{b}\; d \,\text{Cos}\left[c + \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] + \left(15\, b + a\, d^2\right) \text{Sin}\left[c + \frac{i \sqrt{a}\; d}{\sqrt{b}}\right]\right) -$$
$$16\, i\, a^{5/2} \sqrt{b}\; \text{Sin}[c + d\, x] - 50\, i\, a^{3/2}\, b^{3/2}\, x^2 \,\text{Sin}[c + d\, x] - 30\, i \sqrt{a}\; b^{5/2}\, x^4 \,\text{Sin}[c + d\, x] -$$
$$16\, i\, a^{5/2} \sqrt{b}\; d\, x \,\text{Sin}[c] \,\text{SinIntegral}[d\, x] - 32\, i\, a^{3/2}\, b^{3/2}\, d\, x^3 \,\text{Sin}[c] \,\text{SinIntegral}[d\, x] -$$
$$16\, i \sqrt{a}\; b^{5/2}\, d\, x^5 \,\text{Sin}[c] \,\text{SinIntegral}[d\, x] + 15\, a^2\, b\, x \,\text{Cos}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right]$$
$$\text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] + a^3\, d^2\, x \,\text{Cos}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] +$$
$$30\, a\, b^2\, x^3 \,\text{Cos}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] +$$
$$2\, a^2\, b\, d^2\, x^3 \,\text{Cos}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] +$$
$$15\, b^3\, x^5 \,\text{Cos}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] +$$
$$a\, b^2\, d^2\, x^5 \,\text{Cos}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] -$$
$$7\, i\, a^{5/2} \sqrt{b}\; d\, x \,\text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] -$$
$$14\, i\, a^{3/2}\, b^{3/2}\, d\, x^3 \,\text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] -$$
$$7\, i \sqrt{a}\; b^{5/2}\, d\, x^5 \,\text{Sin}\left[c - \frac{i \sqrt{a}\; d}{\sqrt{b}}\right] \text{SinIntegral}\left[d \left(\frac{i \sqrt{a}}{\sqrt{b}} + x\right)\right] +$$

$$15\,a^2\,b\,x\,\mathrm{Cos}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$a^3\,d^2\,x\,\mathrm{Cos}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$30\,a\,b^2\,x^3\,\mathrm{Cos}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$2\,a^2\,b\,d^2\,x^3\,\mathrm{Cos}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$15\,b^3\,x^5\,\mathrm{Cos}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$a\,b^2\,d^2\,x^5\,\mathrm{Cos}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$7\,i\,a^{5/2}\,\sqrt{b}\,d\,x\,\mathrm{Sin}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$14\,i\,a^{3/2}\,b^{3/2}\,d\,x^3\,\mathrm{Sin}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$

$$7\,i\,\sqrt{a}\,b^{5/2}\,d\,x^5\,\mathrm{Sin}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\mathrm{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\Bigg)$$

Problem 78: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 791 leaves, 46 steps):

$$-\frac{d\,\text{Cos}[c+d\,x]}{2\,a^3\,x}-\frac{\sqrt{b}\,d\,\text{Cos}[c+d\,x]}{16\,a^3\left(\sqrt{-a}-\sqrt{b}\,x\right)}+\frac{\sqrt{b}\,d\,\text{Cos}[c+d\,x]}{16\,a^3\left(\sqrt{-a}+\sqrt{b}\,x\right)}-\frac{9\,\sqrt{b}\,d\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,(-a)^{7/2}}+$$

$$\frac{9\,\sqrt{b}\,d\,\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,(-a)^{7/2}}-\frac{3\,b\,\text{CosIntegral}[d\,x]\,\text{Sin}[c]}{a^4}-$$

$$\frac{d^2\,\text{CosIntegral}[d\,x]\,\text{Sin}[c]}{2\,a^3}+\frac{3\,b\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{2\,a^4}+$$

$$\frac{d^2\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,a^3}+\frac{3\,b\,\text{CosIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\,\text{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{2\,a^4}+$$

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

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

$$\frac{3\,b\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,a^4}-\frac{d^2\,\text{Cos}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,a^3}-$$

$$\frac{9\,\sqrt{b}\,d\,\text{Sin}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,(-a)^{7/2}}+\frac{3\,b\,\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,a^4}+$$

$$\frac{d^2\,\text{Cos}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,a^3}-\frac{9\,\sqrt{b}\,d\,\text{Sin}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,(-a)^{7/2}}$$

Result (type 4, 995 leaves) :

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

$$\left(d\,x\left(4\,a^2+7\,a\,b\,x^2+3\,b^2\,x^4\right)\text{Cos}[c]+2\left(2\,a^2+9\,a\,b\,x^2+6\,b^2\,x^4\right)\text{Sin}[c]\right)+\frac{1}{x^2\left(a+b\,x^2\right)^2}$$

$$2\,a\left(-2\left(2\,a^2+9\,a\,b\,x^2+6\,b^2\,x^4\right)\text{Cos}[c]+d\,x\left(4\,a^2+7\,a\,b\,x^2+3\,b^2\,x^4\right)\text{Sin}[c]\right)\text{Sin}[d\,x]-$$

$$8\left(6\,b+a\,d^2\right)\left(\text{CosIntegral}[d\,x]\,\text{Sin}[c]+\text{Cos}[c]\,\text{SinIntegral}[d\,x]\right)+24\,b\,\text{Cos}[c]$$

$$\left(i\,\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]-i\,\text{CosIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\right.$$

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

$$\left(i\,\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]-i\,\text{CosIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\right.$$

$$\left.\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]-\text{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)+$$

$$9\sqrt{a}\,\sqrt{b}\,d\,\text{Cos}[c]\left(-i\,\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\right.$$

$$i\,\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]$$

$$\left.\left(-\text{SinIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)-9\sqrt{a}\,\sqrt{b}\,d\,\text{Sin}[c]$$

$$\left(\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\text{CosIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\right.$$

$$\left.i\,\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)+24\,b\,\text{Sin}[c]$$

$$\left(\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\right.$$

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

$$\left(\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{Cosh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\right.$$

$$\left.\left.i\,\text{Sinh}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+\text{SinIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\right)\right)\right)$$

Problem 94: Result is not expressed in closed-form.

$$\int\frac{x^4\,\text{Sin}[c+d\,x]}{a+b\,x^3}\,dx$$

Optimal (type 4, 371 leaves, 15 steps):

$$-\frac{x\,\mathrm{Cos}[c+d\,x]}{b\,d}+\frac{a^{2/3}\,\mathrm{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\mathrm{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{3\,b^{5/3}}+\frac{(-1)^{2/3}\,a^{2/3}\,\mathrm{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\mathrm{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{3\,b^{5/3}}-\frac{(-1)^{1/3}\,a^{2/3}\,\mathrm{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\mathrm{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{3\,b^{5/3}}+\frac{\mathrm{Sin}[c+d\,x]}{b\,d^2}-\frac{(-1)^{2/3}\,a^{2/3}\,\mathrm{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{3\,b^{5/3}}+\frac{a^{2/3}\,\mathrm{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{3\,b^{5/3}}-\frac{(-1)^{1/3}\,a^{2/3}\,\mathrm{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{3\,b^{5/3}}$$

Result (type 7, 231 leaves):

$$\frac{1}{6\,b^2\,d^2}\Bigg(-i\,a\,d^2\,\mathrm{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1}\big(\mathrm{Cos}[c+d\,\#1]\,\mathrm{CosIntegral}[d\,(x-\#1)]-i\,\mathrm{CosIntegral}[d\,(x-\#1)]\,\mathrm{Sin}[c+d\,\#1]-i\,\mathrm{Cos}[c+d\,\#1]\,\mathrm{SinIntegral}[d\,(x-\#1)]-\mathrm{Sin}[c+d\,\#1]\,\mathrm{SinIntegral}[d\,(x-\#1)]\big)\,\&\Big]+i\,a\,d^2\,\mathrm{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1}\big(\mathrm{Cos}[c+d\,\#1]\,\mathrm{CosIntegral}[d\,(x-\#1)]+i\,\mathrm{CosIntegral}[d\,(x-\#1)]\,\mathrm{Sin}[c+d\,\#1]+i\,\mathrm{Cos}[c+d\,\#1]\,\mathrm{SinIntegral}[d\,(x-\#1)]-\mathrm{Sin}[c+d\,\#1]\,\mathrm{SinIntegral}[d\,(x-\#1)]\big)\,\&\Big]+6\,b\,(-d\,x\,\mathrm{Cos}[c+d\,x]+\mathrm{Sin}[c+d\,x])\Bigg)$$

Problem 95: Result is not expressed in closed-form.

$$\int\frac{x^3\,\mathrm{Sin}[c+d\,x]}{a+b\,x^3}\,dx$$

Optimal (type 4, 357 leaves, 14 steps):

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

Result (type 7, 216 leaves):

$$-\frac{1}{6 b^2 d}\Bigg(6 b\,\text{Cos}[c+d x]+i\,a\,d\,\text{RootSum}\Big[a+b\,\#1^3\,\&,$$
$$\frac{1}{\#1^2}\Big(\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]-i\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]-$$
$$i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]-\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\Big)\,\&\Big]-$$
$$i\,a\,d\,\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\Big(\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]+$$
$$i\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]+i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]-$$
$$\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\Big)\,\&\Big]\Bigg)$$

Problem 96: Result is not expressed in closed-form.

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

Optimal (type 4, 281 leaves, 11 steps):

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

Result (type 7, 186 leaves):

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

Problem 97: Result is not expressed in closed-form.

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

Optimal (type 4, 343 leaves, 11 steps):

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

Result (type 7, 196 leaves):

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

Problem 98: Result is not expressed in closed-form.

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

Optimal (type 4, 343 leaves, 11 steps):

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

Result (type 7, 196 leaves):

$$\frac{1}{6 b} i \left(\text{RootSum}\left[a+b \#1^3 \&, \frac{1}{\#1^2}\left(\text{Cos}[c+d \#1] \text{CosIntegral}[d (x-\#1)]-i \text{CosIntegral}[d (x-\#1)] \text{Sin}[c+d \#1]-i \text{Cos}[c+d \#1] \text{SinIntegral}[d (x-\#1)]-\text{Sin}[c+d \#1] \text{SinIntegral}[d (x-\#1)]\right) \&\right]-\text{RootSum}\left[a+b \#1^3 \&, \frac{1}{\#1^2}\left(\text{Cos}[c+d \#1] \text{CosIntegral}[d (x-\#1)]+i \text{CosIntegral}[d (x-\#1)] \text{Sin}[c+d \#1]+i \text{Cos}[c+d \#1] \text{SinIntegral}[d (x-\#1)]-\text{Sin}[c+d \#1] \text{SinIntegral}[d (x-\#1)]\right) \&\right]\right)$$

Problem 99: Result is not expressed in closed-form.

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

Optimal (type 4, 301 leaves, 16 steps):

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

Result (type 7, 206 leaves):

$$\frac{1}{6\,a}\Big(-i\,\text{RootSum}\big[a+b\,\#1^3\,\&,\ \text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]-i\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]-i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]-\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\&\big]+i\,\text{RootSum}\big[a+b\,\#1^3\,\&,\ \text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]+i\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]+i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]-\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\&\big]+6\,\text{CosIntegral}[d\,x]\,\text{Sin}[c]+6\,\text{Cos}[c]\,\text{SinIntegral}[d\,x]\Big)$$

Problem 100: Result is not expressed in closed-form.

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

Optimal (type 4, 380 leaves, 17 steps):

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

Result (type 7, 233 leaves):

$$\frac{1}{6\,a\,x}\Big(6\,d\,x\,\text{Cos}[c]\,\text{CosIntegral}[d\,x]-i\,x\,\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1}\big(\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]-i\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]-i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]-\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\big)\,\&\Big]+i\,x\,\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1}\big(\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]+i\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]+i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]-\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\big)\,\&\Big]-6\,\text{Sin}[c+d\,x]-6\,d\,x\,\text{Sin}[c]\,\text{SinIntegral}[d\,x]\Big)$$

Problem 101: Result is not expressed in closed-form.

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

Optimal (type 4, 408 leaves, 18 steps):

$$-\frac{d \text{Cos}[c+d x]}{2 a x}-\frac{d^2 \text{CosIntegral}[d x] \text{Sin}[c]}{2 a}-\frac{b^{2/3} \text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right] \text{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right]}{3 a^{5/3}}+\frac{(-1)^{1/3} b^{2/3} \text{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right] \text{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]}{3 a^{5/3}}-\frac{(-1)^{2/3} b^{2/3} \text{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right] \text{Sin}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right]}{3 a^{5/3}}-\frac{\text{Sin}[c+d x]}{2 a x^2}-\frac{d^2 \text{Cos}[c] \text{SinIntegral}[d x]}{2 a}-\frac{(-1)^{1/3} b^{2/3} \text{Cos}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{3 a^{5/3}}-\frac{b^{2/3} \text{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{3 a^{5/3}}-\frac{(-1)^{2/3} b^{2/3} \text{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{3 a^{5/3}}$$

Result (type 7, 253 leaves):

$$\frac{1}{6 a x^2}\left(-i x^2 \text{RootSum}\left[a+b \#1^3\&,\frac{1}{\#1^2}\left(\text{Cos}[c+d \#1] \text{CosIntegral}[d (x-\#1)]-i \text{CosIntegral}[d (x-\#1)] \text{Sin}[c+d \#1]-i \text{Cos}[c+d \#1] \text{SinIntegral}[d (x-\#1)]-\text{Sin}[c+d \#1] \text{SinIntegral}[d (x-\#1)]\right)\&\right]+i x^2 \text{RootSum}\left[a+b \#1^3\&,\frac{1}{\#1^2}\left(\text{Cos}[c+d \#1] \text{CosIntegral}[d (x-\#1)]+i \text{CosIntegral}[d (x-\#1)] \text{Sin}[c+d \#1]+i \text{Cos}[c+d \#1] \text{SinIntegral}[d (x-\#1)]-\text{Sin}[c+d \#1] \text{SinIntegral}[d (x-\#1)]\right)\&\right]-3 \left(d x \text{Cos}[c+d x]+d^2 x^2 \text{CosIntegral}[d x] \text{Sin}[c]+\text{Sin}[c+d x]+d^2 x^2 \text{Cos}[c] \text{SinIntegral}[d x]\right)\right)$$

Problem 102: Result is not expressed in closed-form.

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

Optimal (type 4, 714 leaves, 23 steps):

$$-\frac{(-1)^{2/3}\, d \operatorname{Cos}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{9 a^{1/3} b^{5/3}}-$$

$$\frac{d \operatorname{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \operatorname{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{1/3} b^{5/3}}+$$

$$\frac{(-1)^{1/3}\, d \operatorname{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{1/3} b^{5/3}}+$$

$$\frac{\operatorname{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right] \operatorname{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right]}{9 a^{2/3} b^{4/3}}-$$

$$\frac{(-1)^{1/3} \operatorname{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right] \operatorname{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]}{9 a^{2/3} b^{4/3}}+$$

$$\frac{(-1)^{2/3} \operatorname{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right] \operatorname{Sin}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right]}{9 a^{2/3} b^{4/3}}-$$

$$\frac{x \operatorname{Sin}[c+d x]}{3 b\left(a+b x^3\right)}+\frac{(-1)^{1/3} \operatorname{Cos}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{9 a^{2/3} b^{4/3}}-$$

$$\frac{(-1)^{2/3}\, d \operatorname{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{9 a^{1/3} b^{5/3}}+$$

$$\frac{\operatorname{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{2/3} b^{4/3}}+\frac{d \operatorname{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{1/3} b^{5/3}}+$$

$$\frac{(-1)^{2/3} \operatorname{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{2/3} b^{4/3}}-$$

$$\frac{(-1)^{1/3}\, d \operatorname{Sin}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{1/3} b^{5/3}}$$

Result (type 7, 383 leaves) :

$$\frac{1}{18\,b^2}\Bigg(\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\Big(i\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\big[d\,(x-\#1)\big]+\text{CosIntegral}\big[d\,(x-\#1)\big]\,\text{Sin}[c+d\,\#1]+\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]-i\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]+d\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\big[d\,(x-\#1)\big]\,\#1-i\,d\,\text{CosIntegral}\big[d\,(x-\#1)\big]\,\text{Sin}[c+d\,\#1]\,\#1-i\,d\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]\,\#1-d\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]\,\#1\Big)\,\&\Big]+\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\Big(-i\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\big[d\,(x-\#1)\big]+\text{CosIntegral}\big[d\,(x-\#1)\big]\,\text{Sin}[c+d\,\#1]+\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]+i\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]+d\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\big[d\,(x-\#1)\big]\,\#1+i\,d\,\text{CosIntegral}\big[d\,(x-\#1)\big]\,\text{Sin}[c+d\,\#1]\,\#1+i\,d\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]\,\#1-d\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]\,\#1\Big)\,\&\Big]-\frac{6\,b\,x\,\text{Sin}[c+d\,x]}{a+b\,x^3}\Bigg)$$

Problem 103: Result is not expressed in closed-form.

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

Optimal (type 4, 371 leaves, 12 steps):

$$-\frac{(-1)^{1/3}\,d\,\text{Cos}\Big[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\Big]\,\text{CosIntegral}\Big[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\Big]}{9\,a^{2/3}\,b^{4/3}}+\frac{d\,\text{Cos}\Big[c-\frac{a^{1/3}d}{b^{1/3}}\Big]\,\text{CosIntegral}\Big[\frac{a^{1/3}d}{b^{1/3}}+d\,x\Big]}{9\,a^{2/3}\,b^{4/3}}+\frac{(-1)^{2/3}\,d\,\text{Cos}\Big[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\Big]\,\text{CosIntegral}\Big[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\Big]}{9\,a^{2/3}\,b^{4/3}}-\frac{\text{Sin}[c+d\,x]}{3\,b\,\left(a+b\,x^3\right)}-\frac{(-1)^{1/3}\,d\,\text{Sin}\Big[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\Big]\,\text{SinIntegral}\Big[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\Big]}{9\,a^{2/3}\,b^{4/3}}-\frac{d\,\text{Sin}\Big[c-\frac{a^{1/3}d}{b^{1/3}}\Big]\,\text{SinIntegral}\Big[\frac{a^{1/3}d}{b^{1/3}}+d\,x\Big]}{9\,a^{2/3}\,b^{4/3}}-\frac{(-1)^{2/3}\,d\,\text{Sin}\Big[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\Big]\,\text{SinIntegral}\Big[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\Big]}{9\,a^{2/3}\,b^{4/3}}$$

Result (type 7, 214 leaves):

$$\frac{1}{18\,b^2}\left(d\,\text{RootSum}\left[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\left(\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]-i\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\text{Sin}[c+d\,\#1]-i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]-\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\right)\&\right]+d\,\text{RootSum}\left[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\left(\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]+i\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\text{Sin}[c+d\,\#1]+i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]-\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\right)\&\right]-\frac{6\,b\,\text{Sin}[c+d\,x]}{a+b\,x^3}\right)$$

Problem 104: Result is not expressed in closed-form.

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

Optimal (type 4, 691 leaves, 34 steps):

$$-\frac{d\,\text{Cos}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{9\,a\,b}-\frac{d\,\text{Cos}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a\,b}-\frac{d\,\text{Cos}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a\,b}-\frac{\text{CosIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]}{9\,a^{4/3}\,b^{2/3}}-\frac{(-1)^{2/3}\,\text{CosIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\,\text{Sin}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]}{9\,a^{4/3}\,b^{2/3}}+\frac{(-1)^{1/3}\,\text{CosIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]}{9\,a^{4/3}\,b^{2/3}}+\frac{\text{Sin}[c+d\,x]}{3\,a\,b\,x}-\frac{\text{Sin}[c+d\,x]}{3\,b\,x\,\left(a+b\,x^3\right)}+\frac{(-1)^{2/3}\,\text{Cos}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{9\,a^{4/3}\,b^{2/3}}-\frac{d\,\text{Sin}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{9\,a\,b}-\frac{\text{Cos}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a^{4/3}\,b^{2/3}}+\frac{d\,\text{Sin}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a\,b}+\frac{(-1)^{1/3}\,\text{Cos}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a^{4/3}\,b^{2/3}}+\frac{d\,\text{Sin}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a\,b}$$

Result (type 7, 408 leaves):

$$-\frac{1}{18\,a\,b\,\left(a+b\,x^3\right)}\Bigg(\left(a+b\,x^3\right)\,\text{RootSum}\Big[a+b\,\#1^3\,\&,\,\frac{1}{\#1}\,\Big(-\mathrm{i}\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\big[d\,(x-\#1)\big]-\text{CosIntegral}\big[d\,(x-\#1)\big]\,\text{Sin}[c+d\,\#1]-\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]+\mathrm{i}\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]+d\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\big[d\,(x-\#1)\big]\,\#1-\mathrm{i}\,d\,\text{CosIntegral}\big[d\,(x-\#1)\big]\,\text{Sin}[c+d\,\#1]\,\#1-\mathrm{i}\,d\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]\,\#1-d\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]\,\#1\Big)\,\&\Big]+\left(a+b\,x^3\right)\,\text{RootSum}\Big[a+b\,\#1^3\,\&,\,\frac{1}{\#1}\,\Big(\mathrm{i}\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\big[d\,(x-\#1)\big]-\text{CosIntegral}\big[d\,(x-\#1)\big]\,\text{Sin}[c+d\,\#1]-\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]-\mathrm{i}\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]+d\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\big[d\,(x-\#1)\big]\,\#1+\mathrm{i}\,d\,\text{CosIntegral}\big[d\,(x-\#1)\big]\,\text{Sin}[c+d\,\#1]\,\#1+\mathrm{i}\,d\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]\,\#1-d\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\big[d\,(x-\#1)\big]\,\#1\Big)\,\&\Big]-6\,b\,x^2\,\text{Sin}[c+d\,x]\Bigg)$$

Problem 105: Result is not expressed in closed-form.

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

Optimal (type 4, 735 leaves, 36 steps) :

$$\frac{(-1)^{2/3} d \operatorname{Cos}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{9 a^{4/3} b^{2/3}}+$$

$$\frac{d \operatorname{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \operatorname{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{4/3} b^{2/3}}-$$

$$\frac{(-1)^{1/3} d \operatorname{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{4/3} b^{2/3}}+$$

$$\frac{2 \operatorname{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right] \operatorname{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right]}{9 a^{5/3} b^{1/3}}-$$

$$\frac{2 (-1)^{1/3} \operatorname{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right] \operatorname{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]}{9 a^{5/3} b^{1/3}}+$$

$$\frac{2 (-1)^{2/3} \operatorname{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right] \operatorname{Sin}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right]}{9 a^{5/3} b^{1/3}}+\frac{\operatorname{Sin}[c+d x]}{3 a b x^2}-$$

$$\frac{\operatorname{Sin}[c+d x]}{3 b x^2 \left(a+b x^3\right)}+\frac{2 (-1)^{1/3} \operatorname{Cos}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{9 a^{5/3} b^{1/3}}+$$

$$\frac{(-1)^{2/3} d \operatorname{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{9 a^{4/3} b^{2/3}}+$$

$$\frac{2 \operatorname{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{5/3} b^{1/3}}-\frac{d \operatorname{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{4/3} b^{2/3}}+$$

$$\frac{2 (-1)^{2/3} \operatorname{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{5/3} b^{1/3}}+$$

$$\frac{(-1)^{1/3} d \operatorname{Sin}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \operatorname{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{4/3} b^{2/3}}$$

Result (type 7, 406 leaves) :

$$-\frac{1}{18\,a\,b\,\left(a+b\,x^3\right)}$$

$\Big(\left(a+b\,x^3\right)$ RootSum$\Big[a+b\,\sharp1^3\,\&,\ \frac{1}{\sharp1^2}\Big(-2\,\mathrm{i}\,Cos[c+d\,\sharp1]$ CosIntegral$[d\,(x-\sharp1)]-2$ CosIntegral$[d\,(x-\sharp1)]$ Sin$[c+d\,\sharp1]-2\,$Cos$[c+d\,\sharp1]$ SinIntegral$[d\,(x-\sharp1)]+$
$2\,\mathrm{i}\,$Sin$[c+d\,\sharp1]$ SinIntegral$[d\,(x-\sharp1)]+d\,$Cos$[c+d\,\sharp1]$ CosIntegral$[d\,(x-\sharp1)]\,\sharp1-$
$\mathrm{i}\,d\,$CosIntegral$[d\,(x-\sharp1)]$ Sin$[c+d\,\sharp1]\,\sharp1-\mathrm{i}\,d\,Cos[c+d\,\sharp1]$ SinIntegral$[d\,(x-\sharp1)]\,\sharp1-d\,Sin[c+d\,\sharp1]$ SinIntegral$[d\,(x-\sharp1)]\,\sharp1\Big)\,\&\Big]+$

$\left(a+b\,x^3\right)$ RootSum$\Big[a+b\,\sharp1^3\,\&,\ \frac{1}{\sharp1^2}\Big(2\,\mathrm{i}\,Cos[c+d\,\sharp1]$ CosIntegral$[d\,(x-\sharp1)]-$
$2\,$CosIntegral$[d\,(x-\sharp1)]$ Sin$[c+d\,\sharp1]-2\,$Cos$[c+d\,\sharp1]$ SinIntegral$[d\,(x-\sharp1)]-$
$2\,\mathrm{i}\,$Sin$[c+d\,\sharp1]$ SinIntegral$[d\,(x-\sharp1)]+d\,$Cos$[c+d\,\sharp1]$ CosIntegral$[d\,(x-\sharp1)]\,\sharp1+$
$\mathrm{i}\,d\,$CosIntegral$[d\,(x-\sharp1)]$ Sin$[c+d\,\sharp1]\,\sharp1+\mathrm{i}\,d\,Cos[c+d\,\sharp1]$ SinIntegral$[d\,(x-\sharp1)]$
$\sharp1-d\,$Sin$[c+d\,\sharp1]$ SinIntegral$[d\,(x-\sharp1)]\,\sharp1\Big)\,\&\Big]-6\,b\,x\,Sin[c+d\,x]\Big)$

Problem 106: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 693 leaves, 41 steps):

$$\frac{(-1)^{1/3}\, d \,\text{Cos}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{9 a^{5/3} b^{1/3}}-$$

$$\frac{d \,\text{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{5/3} b^{1/3}}-$$

$$\frac{(-1)^{2/3}\, d \,\text{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{5/3} b^{1/3}}+\frac{\text{CosIntegral}[d x] \,\text{Sin}[c]}{a^2}-$$

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

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

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

$$\frac{(-1)^{1/3}\, d \,\text{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{9 a^{5/3} b^{1/3}}-$$

$$\frac{\text{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{3 a^2}+\frac{d \,\text{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{9 a^{5/3} b^{1/3}}-$$

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

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

Result (type 4, 1819 leaves):

$$\text{Sin}[c]$$

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

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

$$\left(\left(1+(-1)^{1/3}\right)^2 a^2 b^{1/3}\right)+\left(\left(21-22 (-1)^{1/3}+21 (-1)^{2/3}\right) b^{1/3}\right.$$

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

$$\left.\left.\left.\text{Sin}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]+\text{Cos}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]\right)\right)\right)\Big/$$

$$\left(3\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^2 a^{5/3}\right)-\left(\left(2\,b^{1/3}-3\,(-1)^{1/3}\,b^{1/3}+3\,(-1)^{2/3}\,b^{1/3}\right)\right.$$

$$\left.\left(\text{Cos}\left[\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]+\text{Sin}\left[\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\right)\right)\Big/$$

$$\left(\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^2 a^2\,b^{1/3}\right)+$$

$$\left(\left(22-21\,(-1)^{1/3}+21\,(-1)^{2/3}\right)b^{1/3}\left(-\frac{\text{Cos}[d\,x]}{b^{1/3}\left(a^{1/3}+b^{1/3}\,x\right)}+\frac{1}{b^{2/3}}\right.\right.$$

$$\left.\left.d\left(\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\text{Sin}\left[\frac{a^{1/3}\,d}{b^{1/3}}\right]-\text{Cos}\left[\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\right)\right)\right)\Big/$$

$$\left(3\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^2 a^{5/3}\right)-\left(\left(2\,b^{1/3}-3\,(-1)^{1/3}\,b^{1/3}+3\,(-1)^{2/3}\,b^{1/3}\right)\right.$$

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

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

$$\left(\left(22\,b^{1/3}-21\,(-1)^{1/3}\,b^{1/3}+21\,(-1)^{2/3}\,b^{1/3}\right)\left(-\frac{\text{Cos}[d\,x]}{b^{1/3}\left((-1)^{2/3}\,a^{1/3}+b^{1/3}\,x\right)}+\frac{1}{b^{2/3}}\right.\right.$$

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

$$\left.\left.\left.\text{Cos}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]\right)\right)\right)\Big/\left(3\left(1+(-1)^{1/3}\right)^2 a^{5/3}\right)\Bigg)+$$

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

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

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

$$\left(\left(21-22\,(-1)^{1/3}+21\,(-1)^{2/3}\right)b^{1/3}\left(-\frac{\text{Sin}[d\,x]}{b^{1/3}\left(-(-1)^{1/3}\,a^{1/3}+b^{1/3}\,x\right)}+\frac{1}{b^{2/3}}\right.\right.$$

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

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

$$\left(3\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^2 a^{5/3}\right)-\left(\left(2\,b^{1/3}-3\,(-1)^{1/3}\,b^{1/3}+3\,(-1)^{2/3}\,b^{1/3}\right)\right.$$

$$\left(-\text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right] \text{Sin}\left[\frac{a^{1/3} d}{b^{1/3}}\right]+\text{Cos}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]\right)\Bigg)\Big/$$
$$\left(\left(-1+(-1)^{1/3}\right) \left(1+(-1)^{1/3}\right)^2 a^2 b^{1/3}\right)+$$
$$\Bigg(\left(22-21 (-1)^{1/3}+21 (-1)^{2/3}\right) b^{1/3} \Bigg(-\frac{\text{Sin}[d x]}{b^{1/3} \left(a^{1/3}+b^{1/3} x\right)}+\frac{1}{b^{2/3}}$$
$$d \left(\text{Cos}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]+\text{Sin}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]\right)\Bigg)\Bigg)\Big/$$
$$\left(3 \left(-1+(-1)^{1/3}\right) \left(1+(-1)^{1/3}\right)^2 a^{5/3}\right)-\Bigg(\left(2 b^{1/3}-3 (-1)^{1/3} b^{1/3}+3 (-1)^{2/3} b^{1/3}\right)$$
$$\Bigg(-\text{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right] \text{Sin}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right]+\text{Cos}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right]$$
$$\text{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]\Bigg)\Bigg)\Big/\left(\left(-1+(-1)^{1/3}\right) \left(1+(-1)^{1/3}\right)^2 a^2 b^{1/3}\right)+$$
$$\Bigg(\left(22 b^{1/3}-21 (-1)^{1/3} b^{1/3}+21 (-1)^{2/3} b^{1/3}\right) \Bigg(-\frac{\text{Sin}[d x]}{b^{1/3} \left((-1)^{2/3} a^{1/3}+b^{1/3} x\right)}+\frac{1}{b^{2/3}}$$
$$d \Bigg(\text{Cos}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]+$$
$$\text{Sin}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]\Bigg)\Bigg)\Bigg)\Big/\left(3 \left(1+(-1)^{1/3}\right)^2 a^{5/3}\right)$$

Problem 107: Result is not expressed in closed-form.

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

Optimal (type 4, 712 leaves, 47 steps) :

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

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

$$\frac{4\,b^{1/3}\,\text{CosIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\text{Sin}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]}{9\,a^{7/3}}+$$

$$\frac{4\,(-1)^{2/3}\,b^{1/3}\,\text{CosIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\text{Sin}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]}{9\,a^{7/3}}-$$

$$\frac{4\,(-1)^{1/3}\,b^{1/3}\,\text{CosIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]\text{Sin}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]}{9\,a^{7/3}}+$$

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

$$\frac{4\,(-1)^{2/3}\,b^{1/3}\,\text{Cos}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{9\,a^{7/3}}+$$

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

$$\frac{4\,b^{1/3}\,\text{Cos}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a^{7/3}}-\frac{d\,\text{Sin}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a^2}-$$

$$\frac{4\,(-1)^{1/3}\,b^{1/3}\,\text{Cos}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a^{7/3}}-$$

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

Result (type 7, 445 leaves) :

$$-\frac{1}{3 a^2 x \left(a+b x^3\right)}\left(\left(3 a+4 b x^3\right) \text{Cos}[d x] \text{Sin}[c]+\left(3 a+4 b x^3\right) \text{Cos}[c] \text{Sin}[d x]-\frac{1}{6} x \left(a+b x^3\right) \left(18 d \text{Cos}[c] \text{CosIntegral}[d x]+\text{RootSum}\left[a+b \#1^3\&,\frac{1}{\#1}\left(-4 i \text{Cos}[c+d \#1] \text{CosIntegral}[d (x-\#1)]-4 \text{CosIntegral}[d (x-\#1)] \text{Sin}[c+d \#1]-4 \text{Cos}[c+d \#1] \text{SinIntegral}[d (x-\#1)]+4 i \text{Sin}[c+d \#1] \text{SinIntegral}[d (x-\#1)]+d \text{Cos}[c+d \#1] \text{CosIntegral}[d (x-\#1)] \#1-i d \text{CosIntegral}[d (x-\#1)] \text{Sin}[c+d \#1] \#1-i d \text{Cos}[c+d \#1] \text{SinIntegral}[d (x-\#1)] \#1-d \text{Sin}[c+d \#1] \text{SinIntegral}[d (x-\#1)] \#1\right)\&\right]+\text{RootSum}\left[a+b \#1^3\&,\frac{1}{\#1}\left(4 i \text{Cos}[c+d \#1] \text{CosIntegral}[d (x-\#1)]-4 \text{CosIntegral}[d (x-\#1)] \text{Sin}[c+d \#1]-4 \text{Cos}[c+d \#1] \text{SinIntegral}[d (x-\#1)]-4 i \text{Sin}[c+d \#1] \text{SinIntegral}[d (x-\#1)]+d \text{Cos}[c+d \#1] \text{CosIntegral}[d (x-\#1)] \#1+i d \text{CosIntegral}[d (x-\#1)] \text{Sin}[c+d \#1] \#1+i d \text{Cos}[c+d \#1] \text{SinIntegral}[d (x-\#1)] \#1-d \text{Sin}[c+d \#1] \text{SinIntegral}[d (x-\#1)] \#1\right)\&\right]-18 d \text{Sin}[c] \text{SinIntegral}[d x]\right)\right)$$

Problem 108: Result is not expressed in closed-form.

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

Optimal (type 4, 800 leaves, 51 steps):

$$-\frac{d\,\text{Cos}[c+d\,x]}{2\,a^2\,x}-\frac{(-1)^{2/3}\,b^{1/3}\,d\,\text{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{7/3}}-$$
$$\frac{b^{1/3}\,d\,\text{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{7/3}}+$$
$$\frac{(-1)^{1/3}\,b^{1/3}\,d\,\text{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{7/3}}-$$
$$\frac{d^2\,\text{CosIntegral}[d\,x]\,\text{Sin}[c]}{2\,a^2}-\frac{5\,b^{2/3}\,\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{8/3}}+$$
$$\frac{5\,(-1)^{1/3}\,b^{2/3}\,\text{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\text{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{8/3}}-$$
$$\frac{5\,(-1)^{2/3}\,b^{2/3}\,\text{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{8/3}}+$$
$$\frac{\text{Sin}[c+d\,x]}{3\,a\,b\,x^5}-\frac{5\,\text{Sin}[c+d\,x]}{6\,a^2\,x^2}-\frac{\text{Sin}[c+d\,x]}{3\,b\,x^5\,\left(a+b\,x^3\right)}-\frac{d^2\,\text{Cos}[c]\,\text{SinIntegral}[d\,x]}{2\,a^2}-$$
$$\frac{5\,(-1)^{1/3}\,b^{2/3}\,\text{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{8/3}}-$$
$$\frac{(-1)^{2/3}\,b^{1/3}\,d\,\text{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{7/3}}-$$
$$\frac{5\,b^{2/3}\,\text{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{8/3}}+\frac{b^{1/3}\,d\,\text{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{7/3}}-$$
$$\frac{5\,(-1)^{2/3}\,b^{2/3}\,\text{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{8/3}}-$$
$$\frac{(-1)^{1/3}\,b^{1/3}\,d\,\text{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{7/3}}$$

Result (type 7, 470 leaves) :

$$\frac{1}{18 a^2}\left(\text{RootSum}\left[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\left(-5\,i\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]-5\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\text{Sin}[c+d\,\#1]-5\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]+5\,i\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]+d\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]\#1-i\,d\,\text{CosIntegral}\left[d\,(x-\#1)\right]\text{Sin}[c+d\,\#1]\,\#1-i\,d\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\#1-d\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\#1\right)\&\right]+\text{RootSum}\left[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\left(5\,i\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]-5\,\text{CosIntegral}\left[d\,(x-\#1)\right]\text{Sin}[c+d\,\#1]-5\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]-5\,i\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]+d\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]\#1+i\,d\,\text{CosIntegral}\left[d\,(x-\#1)\right]\text{Sin}[c+d\,\#1]\,\#1+i\,d\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\#1-d\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\#1\right)\&\right]-\frac{1}{x^2\left(a+b\,x^3\right)}3\left(3\,a\,d\,x\,\text{Cos}[c+d\,x]+3\,b\,d\,x^4\,\text{Cos}[c+d\,x]+3\,d^2\,x^2\left(a+b\,x^3\right)\text{CosIntegral}[d\,x]\,\text{Sin}[c]+3\,a\,\text{Sin}[c+d\,x]+5\,b\,x^3\,\text{Sin}[c+d\,x]+3\,d^2\,x^2\left(a+b\,x^3\right)\text{Cos}[c]\,\text{SinIntegral}[d\,x]\right)\right)$$

Problem 109: Result is not expressed in closed-form.

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

Optimal (type 4, 772 leaves, 71 steps):

$$\frac{d\,\text{Cos}[c+d\,x]}{18\,a\,b^2\,x}-\frac{d\,\text{Cos}[c+d\,x]}{18\,b^2\,x\,\left(a+b\,x^3\right)}+$$

$$\frac{\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{27\,a^{5/3}\,b^{4/3}}+\frac{d^2\,\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{54\,a\,b^2}-$$

$$\frac{(-1)^{1/3}\,\text{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\text{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{27\,a^{5/3}\,b^{4/3}}+$$

$$\frac{d^2\,\text{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\text{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{54\,a\,b^2}+$$

$$\frac{(-1)^{2/3}\,\text{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{27\,a^{5/3}\,b^{4/3}}+$$

$$\frac{d^2\,\text{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{54\,a\,b^2}+\frac{\text{Sin}[c+d\,x]}{18\,a\,b^2\,x^2}-\frac{x\,\text{Sin}[c+d\,x]}{6\,b\,\left(a+b\,x^3\right)^2}-$$

$$\frac{\text{Sin}[c+d\,x]}{18\,b^2\,x^2\,\left(a+b\,x^3\right)}+\frac{(-1)^{1/3}\,\text{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^{5/3}\,b^{4/3}}-$$

$$\frac{d^2\,\text{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{54\,a\,b^2}+$$

$$\frac{\text{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}+\frac{d^2\,\text{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a\,b^2}+$$

$$\frac{(-1)^{2/3}\,\text{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}+$$

$$\frac{d^2\,\text{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a\,b^2}$$

Result (type 7, 457 leaves) :

$$\frac{1}{108\,a\,b^2}\left(i\,\text{RootSum}\left[a+b\,\#1^3\,\&,\frac{1}{\#1^2}\left(2\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]-2\,i\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\text{Sin}[c+d\,\#1]-2\,i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]-2\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]+d^2\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\#1^2-i\,d^2\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\text{Sin}[c+d\,\#1]\,\#1^2-i\,d^2\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\,\#1^2-d^2\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\,\#1^2\right)\,\&\right]-i\,\text{RootSum}\left[a+b\,\#1^3\,\&,\frac{1}{\#1^2}\left(2\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]+2\,i\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\text{Sin}[c+d\,\#1]+2\,i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]-2\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]+d^2\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\#1^2+i\,d^2\,\text{CosIntegral}\left[d\,(x-\#1)\right]\,\text{Sin}[c+d\,\#1]\,\#1^2+i\,d^2\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\,\#1^2-d^2\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}\left[d\,(x-\#1)\right]\,\#1^2\right)\,\&\right]+\frac{6\,b\,x\,\left(d\,x\,\left(a+b\,x^3\right)\,\text{Cos}[c+d\,x]+\left(-2\,a+b\,x^3\right)\,\text{Sin}[c+d\,x]\right)}{\left(a+b\,x^3\right)^2}\right)$$

Problem 110: Result is not expressed in closed-form.

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

Optimal (type 4, 777 leaves, 37 steps) :

$$\frac{d\,\text{Cos}[c+d\,x]}{18\,a\,b^2\,x^2}-\frac{d\,\text{Cos}[c+d\,x]}{18\,b^2\,x^2\,\left(a+b\,x^3\right)}-\frac{(-1)^{1/3}\,d\,\text{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^{5/3}\,b^{4/3}}+$$

$$\frac{d\,\text{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}+$$

$$\frac{(-1)^{2/3}\,d\,\text{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}-$$

$$\frac{d^2\,\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{54\,a^{4/3}\,b^{5/3}}-$$

$$\frac{(-1)^{2/3}\,d^2\,\text{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\text{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{54\,a^{4/3}\,b^{5/3}}+$$

$$\frac{(-1)^{1/3}\,d^2\,\text{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{54\,a^{4/3}\,b^{5/3}}-$$

$$\frac{\text{Sin}[c+d\,x]}{6\,b\,\left(a+b\,x^3\right)^2}+\frac{(-1)^{2/3}\,d^2\,\text{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{54\,a^{4/3}\,b^{5/3}}-$$

$$\frac{(-1)^{1/3}\,d\,\text{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^{5/3}\,b^{4/3}}-$$

$$\frac{d^2\,\text{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a^{4/3}\,b^{5/3}}-\frac{d\,\text{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}+$$

$$\frac{(-1)^{1/3}\,d^2\,\text{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a^{4/3}\,b^{5/3}}-$$

$$\frac{(-1)^{2/3}\,d\,\text{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}$$

Result (type 7, 449 leaves) :

$$\frac{1}{108\,a\,b^2}\left(\mathrm{i}\,d\,\text{RootSum}\left[a+b\,\sharp1^3\,\&,\ \frac{1}{\sharp1^2}\left(-2\,\mathrm{i}\,\text{Cos}[c+d\,\sharp1]\,\text{CosIntegral}\left[d\left(x-\sharp1\right)\right]-2\,\text{CosIntegral}\left[d\left(x-\sharp1\right)\right]\text{Sin}[c+d\,\sharp1]-2\,\text{Cos}[c+d\,\sharp1]\,\text{SinIntegral}\left[d\left(x-\sharp1\right)\right]+2\,\mathrm{i}\,\text{Sin}[c+d\,\sharp1]\,\text{SinIntegral}\left[d\left(x-\sharp1\right)\right]+d\,\text{Cos}[c+d\,\sharp1]\,\text{CosIntegral}\left[d\left(x-\sharp1\right)\right]\sharp1-\mathrm{i}\,d\,\text{CosIntegral}\left[d\left(x-\sharp1\right)\right]\text{Sin}[c+d\,\sharp1]\,\sharp1-\mathrm{i}\,d\,\text{Cos}[c+d\,\sharp1]\,\text{SinIntegral}\left[d\left(x-\sharp1\right)\right]\sharp1-d\,\text{Sin}[c+d\,\sharp1]\,\text{SinIntegral}\left[d\left(x-\sharp1\right)\right]\sharp1\right)\&\right]-\mathrm{i}\,d\,\text{RootSum}\left[a+b\,\sharp1^3\,\&,\ \frac{1}{\sharp1^2}\left(2\,\mathrm{i}\,\text{Cos}[c+d\,\sharp1]\,\text{CosIntegral}\left[d\left(x-\sharp1\right)\right]-2\,\text{CosIntegral}\left[d\left(x-\sharp1\right)\right]\text{Sin}[c+d\,\sharp1]-2\,\text{Cos}[c+d\,\sharp1]\,\text{SinIntegral}\left[d\left(x-\sharp1\right)\right]-2\,\mathrm{i}\,\text{Sin}[c+d\,\sharp1]\,\text{SinIntegral}\left[d\left(x-\sharp1\right)\right]+d\,\text{Cos}[c+d\,\sharp1]\,\text{CosIntegral}\left[d\left(x-\sharp1\right)\right]\sharp1+\mathrm{i}\,d\,\text{CosIntegral}\left[d\left(x-\sharp1\right)\right]\text{Sin}[c+d\,\sharp1]\,\sharp1+\mathrm{i}\,d\,\text{Cos}[c+d\,\sharp1]\,\text{SinIntegral}\left[d\left(x-\sharp1\right)\right]\sharp1-d\,\text{Sin}[c+d\,\sharp1]\,\text{SinIntegral}\left[d\left(x-\sharp1\right)\right]\sharp1\right)\&\right]+\frac{6\,b\,\text{Cos}[d\,x]\left(d\,x\left(a+b\,x^3\right)\text{Cos}[c]-3\,a\,\text{Sin}[c]\right)}{\left(a+b\,x^3\right)^2}-\frac{6\,b\left(3\,a\,\text{Cos}[c]+d\,x\left(a+b\,x^3\right)\text{Sin}[c]\right)\text{Sin}[d\,x]}{\left(a+b\,x^3\right)^2}\right)$$

Problem 111: Result is not expressed in closed-form.

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

Optimal (type 4, 1141 leaves, 89 steps):

$$\frac{d\,\mathrm{Cos}[c+d\,x]}{18\,a\,b^2\,x^3}-\frac{d\,\mathrm{Cos}[c+d\,x]}{18\,b^2\,x^3\,\left(a+b\,x^3\right)}-\frac{2\,d\,\mathrm{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^2\,b}-$$

$$\frac{2\,d\,\mathrm{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^2\,b}-\frac{2\,d\,\mathrm{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^2\,b}-$$

$$\frac{2\,\mathrm{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\mathrm{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{27\,a^{7/3}\,b^{2/3}}+\frac{d^2\,\mathrm{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\mathrm{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{54\,a^{5/3}\,b^{4/3}}-$$

$$\frac{2\,(-1)^{2/3}\,\mathrm{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\mathrm{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{27\,a^{7/3}\,b^{2/3}}-$$

$$\frac{(-1)^{1/3}\,d^2\,\mathrm{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\mathrm{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{54\,a^{5/3}\,b^{4/3}}+$$

$$\frac{2\,(-1)^{1/3}\,\mathrm{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\mathrm{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{27\,a^{7/3}\,b^{2/3}}+$$

$$\frac{(-1)^{2/3}\,d^2\,\mathrm{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\mathrm{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{54\,a^{5/3}\,b^{4/3}}-\frac{\mathrm{Sin}[c+d\,x]}{18\,a\,b^2\,x^4}+\frac{2\,\mathrm{Sin}[c+d\,x]}{9\,a^2\,b\,x}-$$

$$\frac{\mathrm{Sin}[c+d\,x]}{6\,b\,x\,\left(a+b\,x^3\right)^2}+\frac{\mathrm{Sin}[c+d\,x]}{18\,b^2\,x^4\,\left(a+b\,x^3\right)}+\frac{2\,(-1)^{2/3}\,\mathrm{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^{7/3}\,b^{2/3}}+$$

$$\frac{(-1)^{1/3}\,d^2\,\mathrm{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{54\,a^{5/3}\,b^{4/3}}-$$

$$\frac{2\,d\,\mathrm{Sin}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^2\,b}-\frac{2\,\mathrm{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{7/3}\,b^{2/3}}+$$

$$\frac{d^2\,\mathrm{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a^{5/3}\,b^{4/3}}+\frac{2\,d\,\mathrm{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^2\,b}+$$

$$\frac{2\,(-1)^{1/3}\,\mathrm{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{7/3}\,b^{2/3}}+$$

$$\frac{(-1)^{2/3}\,d^2\,\mathrm{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a^{5/3}\,b^{4/3}}+$$

$$\frac{2\,d\,\mathrm{Sin}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\mathrm{SinIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^2\,b}$$

Result (type 7, 698 leaves) :

$$-\frac{1}{108\, a^2\, b^2}\Bigg(\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\Big(-i\, a\, d^2\, \text{Cos}[c+d\,\#1]\, \text{CosIntegral}[d\,(x-\#1)] - a\, d^2\, \text{CosIntegral}[d\,(x-\#1)]\, \text{Sin}[c+d\,\#1] - a\, d^2\, \text{Cos}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)] +$$
$$i\, a\, d^2\, \text{Sin}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)] - 4\, i\, b\, \text{Cos}[c+d\,\#1]\, \text{CosIntegral}[d\,(x-\#1)]\, \#1 - 4\, b\, \text{CosIntegral}[d\,(x-\#1)]\, \text{Sin}[c+d\,\#1]\, \#1 -$$
$$4\, b\, \text{Cos}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)]\, \#1 + 4\, i\, b\, \text{Sin}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)]\, \#1 + 4\, b\, d\, \text{Cos}[c+d\,\#1]\, \text{CosIntegral}[d\,(x-\#1)]\, \#1^2 -$$
$$4\, i\, b\, d\, \text{CosIntegral}[d\,(x-\#1)]\, \text{Sin}[c+d\,\#1]\, \#1^2 - 4\, i\, b\, d\, \text{Cos}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)]\, \#1^2 - 4\, b\, d\, \text{Sin}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)]\, \#1^2\Big)\,\&\Big] +$$
$$\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\Big(i\, a\, d^2\, \text{Cos}[c+d\,\#1]\, \text{CosIntegral}[d\,(x-\#1)] - a\, d^2\, \text{CosIntegral}[d\,(x-\#1)]\, \text{Sin}[c+d\,\#1] - a\, d^2\, \text{Cos}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)] -$$
$$i\, a\, d^2\, \text{Sin}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)] + 4\, i\, b\, \text{Cos}[c+d\,\#1]\, \text{CosIntegral}[d\,(x-\#1)]\, \#1 - 4\, b\, \text{CosIntegral}[d\,(x-\#1)]\, \text{Sin}[c+d\,\#1]\, \#1 -$$
$$4\, b\, \text{Cos}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)]\, \#1 - 4\, i\, b\, \text{Sin}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)]\, \#1 + 4\, b\, d\, \text{Cos}[c+d\,\#1]\, \text{CosIntegral}[d\,(x-\#1)]\, \#1^2 +$$
$$4\, i\, b\, d\, \text{CosIntegral}[d\,(x-\#1)]\, \text{Sin}[c+d\,\#1]\, \#1^2 + 4\, i\, b\, d\, \text{Cos}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)]\, \#1^2 - 4\, b\, d\, \text{Sin}[c+d\,\#1]\, \text{SinIntegral}[d\,(x-\#1)]\, \#1^2\Big)\,\&\Big] -$$
$$\frac{6\, b\, \text{Cos}[d\, x]\, \left(a\, d\, (a+b\, x^3)\, \text{Cos}[c] + b\, x^2\, (7\, a+4\, b\, x^3)\, \text{Sin}[c]\right)}{(a+b\, x^3)^2} - \frac{6\, b\, \left(b\, x^2\, (7\, a+4\, b\, x^3)\, \text{Cos}[c] - a\, d\, (a+b\, x^3)\, \text{Sin}[c]\right)\, \text{Sin}[d\, x]}{(a+b\, x^3)^2}\Bigg)$$

Problem 112: Result is not expressed in closed-form.

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

Optimal (type 4, 1161 leaves, 99 steps):

$$\frac{d\, \text{Cos}[c+d\, x]}{18\, a\, b^2\, x^4} - \frac{d\, \text{Cos}[c+d\, x]}{18\, a^2\, b\, x} - \frac{d\, \text{Cos}[c+d\, x]}{18\, b^2\, x^4\, (a+b\, x^3)} +$$
$$\frac{(-1)^{2/3}\, d\, \text{Cos}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]\, \text{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}} - d\, x\right]}{9\, a^{7/3}\, b^{2/3}} +$$
$$\frac{d\, \text{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right]\, \text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}} + d\, x\right]}{9\, a^{7/3}\, b^{2/3}} -$$
$$\frac{(-1)^{1/3}\, d\, \text{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right]\, \text{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}} + d\, x\right]}{9\, a^{7/3}\, b^{2/3}} +$$
$$\frac{5\, \text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}} + d\, x\right]\, \text{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right]}{27\, a^{8/3}\, b^{1/3}} - \frac{d^2\, \text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}} + d\, x\right]\, \text{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right]}{54\, a^2\, b} -$$

$$\frac{5\,(-1)^{1/3}\,\text{CosIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\text{Sin}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]}{27\,a^{8/3}\,b^{1/3}}-$$

$$\frac{d^2\,\text{CosIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\text{Sin}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]}{54\,a^2\,b}+$$

$$\frac{5\,(-1)^{2/3}\,\text{CosIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]\text{Sin}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]}{27\,a^{8/3}\,b^{1/3}}-$$

$$\frac{d^2\,\text{CosIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]\text{Sin}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]}{54\,a^2\,b}-\frac{\text{Sin}[c+d\,x]}{9\,a\,b^2\,x^5}+\frac{5\,\text{Sin}[c+d\,x]}{18\,a^2\,b\,x^2}-$$

$$\frac{\text{Sin}[c+d\,x]}{6\,b\,x^2\,\left(a+b\,x^3\right)^2}+\frac{\text{Sin}[c+d\,x]}{9\,b^2\,x^5\,\left(a+b\,x^3\right)}+\frac{5\,(-1)^{1/3}\,\text{Cos}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{27\,a^{8/3}\,b^{1/3}}+$$

$$\frac{d^2\,\text{Cos}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{54\,a^2\,b}+$$

$$\frac{(-1)^{2/3}\,d\,\text{Sin}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{9\,a^{7/3}\,b^{2/3}}+$$

$$\frac{5\,\text{Cos}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{27\,a^{8/3}\,b^{1/3}}-$$

$$\frac{d^2\,\text{Cos}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{54\,a^2\,b}-\frac{d\,\text{Sin}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a^{7/3}\,b^{2/3}}+$$

$$\frac{5\,(-1)^{2/3}\,\text{Cos}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]}{27\,a^{8/3}\,b^{1/3}}-$$

$$\frac{d^2\,\text{Cos}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]}{54\,a^2\,b}+$$

$$\frac{(-1)^{1/3}\,d\,\text{Sin}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]}{9\,a^{7/3}\,b^{2/3}}$$

Result (type 7, 675 leaves) :

$$\frac{1}{108\,a^2}\left(-\frac{1}{b}\,i\,\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\Big(-10\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]+10\,i\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]+10\,i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]+10\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]-6\,i\,d\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]\,\#1-6\,d\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]\,\#1-6\,d\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\#1+6\,i\,d\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\#1+d^2\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]\,\#1^2-i\,d^2\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]\,\#1^2-i\,d^2\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\#1^2-d^2\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\#1^2\Big)\,\&\Big]+\frac{1}{b}\,i\,\text{RootSum}\Big[a+b\,\#1^3\,\&,\ \frac{1}{\#1^2}\Big(-10\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]-10\,i\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]-10\,i\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]+10\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]+6\,i\,d\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]\,\#1-6\,d\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]\,\#1-6\,d\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\#1-6\,i\,d\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\#1+d^2\,\text{Cos}[c+d\,\#1]\,\text{CosIntegral}[d\,(x-\#1)]\,\#1^2+i\,d^2\,\text{CosIntegral}[d\,(x-\#1)]\,\text{Sin}[c+d\,\#1]\,\#1^2+i\,d^2\,\text{Cos}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\#1^2-d^2\,\text{Sin}[c+d\,\#1]\,\text{SinIntegral}[d\,(x-\#1)]\,\#1^2\Big)\,\&\Big]-\frac{6\,x\,\text{Cos}[d\,x]\,\left(d\,x\,\left(a+b\,x^3\right)\,\text{Cos}[c]-\left(8\,a+5\,b\,x^3\right)\,\text{Sin}[c]\right)}{\left(a+b\,x^3\right)^2}+\frac{6\,x\,\left(\left(8\,a+5\,b\,x^3\right)\,\text{Cos}[c]+d\,x\,\left(a+b\,x^3\right)\,\text{Sin}[c]\right)\,\text{Sin}[d\,x]}{\left(a+b\,x^3\right)^2}\right)$$

Problem 113: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 1163 leaves, 110 steps):

$$\frac{d\,\text{Cos}[c+d\,x]}{18\,a\,b^2\,x^5}-\frac{d\,\text{Cos}[c+d\,x]}{18\,a^2\,b\,x^2}-\frac{d\,\text{Cos}[c+d\,x]}{18\,b^2\,x^5\,\left(a+b\,x^3\right)}+\frac{4\,(-1)^{1/3}\,d\,\text{Cos}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^{8/3}\,b^{1/3}}-\frac{4\,d\,\text{Cos}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{8/3}\,b^{1/3}}-\frac{4\,(-1)^{2/3}\,d\,\text{Cos}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CosIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{8/3}\,b^{1/3}}+\frac{\text{CosIntegral}[d\,x]\,\text{Sin}[c]}{a^3}-\frac{\text{CosIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sin}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{3\,a^3}+$$

$$\frac{d^2\,\text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right] \text{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right]}{54\, a^{7/3}\, b^{2/3}}-\frac{\text{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right] \text{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]}{3\, a^3}+$$

$$\frac{(-1)^{2/3} d^2\,\text{CosIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right] \text{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]}{54\, a^{7/3}\, b^{2/3}}-$$

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

$$\frac{(-1)^{1/3} d^2\,\text{CosIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right] \text{Sin}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right]}{54\, a^{7/3}\, b^{2/3}}-$$

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

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

$$\frac{(-1)^{2/3} d^2\,\text{Cos}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{54\, a^{7/3}\, b^{2/3}}+$$

$$\frac{4\, (-1)^{1/3} d\,\text{Sin}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{27\, a^{8/3}\, b^{1/3}}-$$

$$\frac{\text{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{3\, a^3}+\frac{d^2\,\text{Cos}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{54\, a^{7/3}\, b^{2/3}}+$$

$$\frac{4\, d\,\text{Sin}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{27\, a^{8/3}\, b^{1/3}}-\frac{\text{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{3\, a^3}-$$

$$\frac{(-1)^{1/3} d^2\,\text{Cos}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{54\, a^{7/3}\, b^{2/3}}+$$

$$\frac{4\, (-1)^{2/3} d\,\text{Sin}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{27\, a^{8/3}\, b^{1/3}}$$

Result (type 4, 2929 leaves):

$$\text{Sin}[c] \left(\frac{\text{CosIntegral}[d x]}{a^3}-\right.$$

$$\left(\left(-1\right)^{2/3} \left(63-64 \left(-1\right)^{1/3}+62 \left(-1\right)^{2/3}\right) \left(d^2\,\text{Cos}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[d \left(\frac{a^{1/3}}{b^{1/3}}+x\right)\right]+\right.\right.$$

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

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

$$\left(18\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^3 a^{7/3} b^{2/3}\right)-\left((-1)^{2/3}\left(64-62(-1)^{1/3}+63(-1)^{2/3}\right)\right.$$

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

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

$$\left.\left.\text{SinIntegral}\left[d\left(\frac{(-1)^{2/3} a^{1/3}}{b^{1/3}}+x\right)\right]\right)\right) \Big/ \left(18\left(1+(-1)^{1/3}\right)^3 a^{7/3} b^{2/3}\right)+$$

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

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

$$\left((-1)^{2/3}\left(64-62(-1)^{1/3}+63(-1)^{2/3}\right)\left(d^2 \text{Cos}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[\right.\right.\right.$$

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

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

$$\left(18\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^3 a^{7/3} b^{2/3}\right)-\left((-1)^{2/3}\left(59-67(-1)^{1/3}+63(-1)^{2/3}\right)\right.$$

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

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

$$\left(9\left(1+(-1)^{1/3}\right)^3 a^{8/3}\right)-\left((-1)^{2/3}\left(5 b^{1/3}-5(-1)^{1/3} b^{1/3}+4(-1)^{2/3} b^{1/3}\right)\right.$$

$$\left.\left(\text{Cos}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d\,x\right]+\text{Sin}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d\,x\right]\right)\right) \Big/$$

$$\left(\left(1+(-1)^{1/3}\right)^2 a^3 b^{1/3}\right)-\left(\left(59-67(-1)^{1/3}+63(-1)^{2/3}\right) b^{1/3}\left(-\frac{\text{Cos}[d\,x]}{b^{1/3}\left(a^{1/3}+b^{1/3} x\right)}+\frac{1}{b^{2/3}}\right.\right.$$

$$\left.\left.d\left(\text{CosIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d\,x\right] \text{Sin}\left[\frac{a^{1/3} d}{b^{1/3}}\right]-\text{Cos}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d\,x\right]\right)\right)\right) \Big/$$

$$\left(9\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^3 a^{8/3}\right)+\left((-1)^{2/3}\left(2\,b^{1/3}-2\,(-1)^{1/3}\,b^{1/3}+3\,(-1)^{2/3}\,b^{1/3}\right)\right.$$

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

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

$$\left(\left(1+(-1)^{1/3}\right)^2 a^3\,b^{1/3}\right)-\left((-1)^{2/3}\left(59\,b^{1/3}-67\,(-1)^{1/3}\,b^{1/3}+63\,(-1)^{2/3}\,b^{1/3}\right)\right.$$

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

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

$$\left.\left(9\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^3 a^{8/3}\right)\right)+\text{Cos}[c]\left(\frac{\text{SinIntegral}[d\,x]}{a^3}-\right.$$

$$\left((-1)^{2/3}\left(63-64\,(-1)^{1/3}+62\,(-1)^{2/3}\right)\left(-d^2\,\text{CosIntegral}\left[d\left(\frac{a^{1/3}}{b^{1/3}}+x\right)\right]\,\text{Sin}\left[\frac{a^{1/3}\,d}{b^{1/3}}\right]+\right.\right.$$

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

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

$$\left(18\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^3 a^{7/3}\,b^{2/3}\right)-\left((-1)^{2/3}\left(64-62\,(-1)^{1/3}+63\,(-1)^{2/3}\right)\right.$$

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

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

$$\left.\left.\text{SinIntegral}\left[d\left(\frac{(-1)^{2/3}\,a^{1/3}}{b^{1/3}}+x\right)\right]\right)\right)\Big/\left(18\left(1+(-1)^{1/3}\right)^3 a^{7/3}\,b^{2/3}\right)+$$

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

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

$$\Bigg((-1)^{2/3}\left(64-62(-1)^{1/3}+63(-1)^{2/3}\right)\Bigg(-d^2\,\text{CosIntegral}\left[d\left(-\frac{(-1)^{1/3}a^{1/3}}{b^{1/3}}+x\right)\right]$$

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

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

$$\left(18\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^3a^{7/3}b^{2/3}\right)-\Bigg((-1)^{2/3}\left(59-67(-1)^{1/3}+63(-1)^{2/3}\right)$$

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

$$-\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}+d\,x\Big]+\text{Sin}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\Bigg)\Bigg)\Bigg)\Big/$$

$$\left(9\left(1+(-1)^{1/3}\right)^3a^{8/3}\right)-\Bigg((-1)^{2/3}\left(5\,b^{1/3}-5(-1)^{1/3}b^{1/3}+4(-1)^{2/3}b^{1/3}\right)$$

$$\left(-\text{CosIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\text{Sin}\left[\frac{a^{1/3}d}{b^{1/3}}\right]+\text{Cos}\left[\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\right)\Bigg)\Big/$$

$$\left(\left(1+(-1)^{1/3}\right)^2a^3b^{1/3}\right)-\Bigg(\left(59-67(-1)^{1/3}+63(-1)^{2/3}\right)b^{1/3}\Bigg(-\frac{\text{Sin}[d\,x]}{b^{1/3}\left(a^{1/3}+b^{1/3}x\right)}+\frac{1}{b^{2/3}}$$

$$d\left(\text{Cos}\left[\frac{a^{1/3}d}{b^{1/3}}\right]\text{CosIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]+\text{Sin}\left[\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\right)\Bigg)\Bigg)\Big/$$

$$\left(9\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^3a^{8/3}\right)+\Bigg((-1)^{2/3}\left(2\,b^{1/3}-2(-1)^{1/3}b^{1/3}+3(-1)^{2/3}b^{1/3}\right)$$

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

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

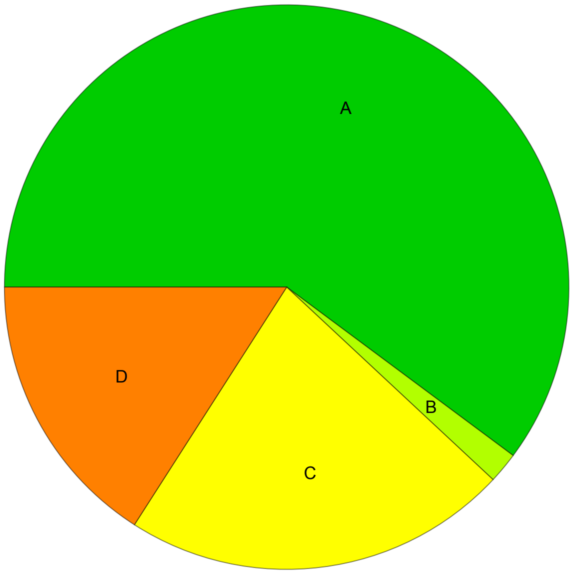
$$\Bigg((-1)^{2/3}\left(59\,b^{1/3}-67(-1)^{1/3}b^{1/3}+63(-1)^{2/3}b^{1/3}\right)\Bigg(-\frac{\text{Sin}[d\,x]}{b^{1/3}\left((-1)^{2/3}a^{1/3}+b^{1/3}x\right)}+$$

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

$$\text{SinIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]\Bigg)\Bigg)\Bigg)\Big/\left(9\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^3a^{8/3}\right)\Bigg)$$

Summary of Integration Test Results

113 integration problems



A - 68 optimal antiderivatives

B - 2 more than twice size of optimal antiderivatives

C - 25 unnecessarily complex antiderivatives

D - 18 unable to integrate problems

E - 0 integration timeouts