Mathematica 11.3 Integration Test Results

Test results for the 111 problems in "6.2.2 (e x)^m (a+b x^n)^p cosh.m"

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

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

Optimal (type 4, 262 leaves, 17 steps):

$$\frac{\text{Cosh}[c+d\,x]}{2\,a\,(a+b\,x)^2}+\frac{\text{Cosh}[c+d\,x]}{a^2\,(a+b\,x)}+\frac{\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]}{a^3}-\frac{\text{Cosh}\left[c-\frac{a\,d}{b}\right]\text{CoshIntegral}\left[\frac{a\,d}{b}+d\,x\right]}{a^3}-$$
$$\frac{d^2\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\text{CoshIntegral}\left[\frac{a\,d}{b}+d\,x\right]}{2\,a\,b^2}-\frac{d\,\text{CoshIntegral}\left[\frac{a\,d}{b}+d\,x\right]\text{Sinh}\left[c-\frac{a\,d}{b}\right]}{a^2\,b}+$$
$$\frac{d\,\text{Sinh}[c+d\,x]}{2\,a\,b\,(a+b\,x)}+\frac{\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]}{a^3}-\frac{d\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[\frac{a\,d}{b}+d\,x\right]}{a^2\,b}-$$
$$\frac{\text{Sinh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[\frac{a\,d}{b}+d\,x\right]}{a^3}-\frac{d^2\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[\frac{a\,d}{b}+d\,x\right]}{2\,a\,b^2}$$

Result (type 4, 614 leaves):

$$-\frac{1}{2\,a^3\,b^2\,(a+b\,x)^2}\left(-3\,a^2\,b^2\,\text{Cosh}[c+d\,x]-2\,a\,b^3\,x\,\text{Cosh}[c+d\,x]-2\,b^2\,(a+b\,x)^2\,\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]+2\,b^2\,(a+b\,x)^2\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\,\text{CoshIntegral}\left[d\left(\frac{a}{b}+x\right)\right]+a^4\,d^2\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+2\,a^3\,b\,d^2\,x\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+a^2\,b^2\,d^2\,x^2\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+2\,a^3\,b\,d\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]+4\,a^2\,b^2\,d\,x\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]+2\,a\,b^3\,d\,x^2\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]-a^3\,b\,d\,\text{Sinh}[c+d\,x]-a^2\,b^2\,d\,x\,\text{Sinh}[c+d\,x]-2\,a^2\,b^2\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]-4\,a\,b^3\,x\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]-2\,b^4\,x^2\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]+2\,a^2\,b^2\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[d\left(\frac{a}{b}+x\right)\right]+4\,a\,b^3\,x\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[d\left(\frac{a}{b}+x\right)\right]+2\,b^4\,x^2\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[d\left(\frac{a}{b}+x\right)\right]+2\,a^3\,b\,d\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+4\,a^2\,b^2\,d\,x\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+2\,a\,b^3\,d\,x^2\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+a^4\,d^2\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+2\,a^3\,b\,d^2\,x\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+a^2\,b^2\,d^2\,x^2\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\,\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]\right)$$

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

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

Optimal (type 4, 298 leaves, 21 steps):

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

Result (type 4, 710 leaves) :

$$\frac{1}{2\,a^4\,b\,x\,(a+b\,x)^2}\left(-2\,a^3\,b\,\text{Cosh}[c+d\,x]-9\,a^2\,b^2\,x\,\text{Cosh}[c+d\,x]-6\,a\,b^3\,x^2\,\text{Cosh}[c+d\,x]+6\,b^2\,x\,(a+b\,x)^2\right.$$
$$\text{Cosh}\left[c-\frac{a\,d}{b}\right]\text{CoshIntegral}\left[d\left(\frac{a}{b}+x\right)\right]+a^4\,d^2\,x\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+$$
$$2\,a^3\,b\,d^2\,x^2\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+a^2\,b^2\,d^2\,x^3\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]$$
$$\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+2\,b\,x\,(a+b\,x)^2\,\text{CoshIntegral}[d\,x]\,(-3\,b\,\text{Cosh}[c]+a\,d\,\text{Sinh}[c])+$$
$$4\,a^3\,b\,d\,x\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]\text{Sinh}\left[c-\frac{a\,d}{b}\right]+8\,a^2\,b^2\,d\,x^2\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]$$
$$\text{Sinh}\left[c-\frac{a\,d}{b}\right]+4\,a\,b^3\,d\,x^3\,\text{CoshIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]\text{Sinh}\left[c-\frac{a\,d}{b}\right]-$$
$$a^3\,b\,d\,x\,\text{Sinh}[c+d\,x]-a^2\,b^2\,d\,x^2\,\text{Sinh}[c+d\,x]+2\,a^3\,b\,d\,x\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]+$$
$$4\,a^2\,b^2\,d\,x^2\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]+2\,a\,b^3\,d\,x^3\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]-$$
$$6\,a^2\,b^2\,x\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]-12\,a\,b^3\,x^2\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]-$$
$$6\,b^4\,x^3\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]+6\,a^2\,b^2\,x\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[d\left(\frac{a}{b}+x\right)\right]+$$
$$12\,a\,b^3\,x^2\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[d\left(\frac{a}{b}+x\right)\right]+$$
$$6\,b^4\,x^3\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[d\left(\frac{a}{b}+x\right)\right]+$$
$$4\,a^3\,b\,d\,x\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+8\,a^2\,b^2\,d\,x^2\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]$$
$$\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+4\,a\,b^3\,d\,x^3\,\text{Cosh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+$$
$$a^4\,d^2\,x\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+2\,a^3\,b\,d^2\,x^2\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]$$
$$\left.\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]+a^2\,b^2\,d^2\,x^3\,\text{Sinh}\left[c-\frac{a\,d}{b}\right]\text{SinhIntegral}\left[\frac{d\,(a+b\,x)}{b}\right]\right)$$

Problem 57: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{x^4\,\text{Cosh}[c+d\,x]}{a+b\,x^2}\,\mathbb{d}x$$

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

$$-\frac{2\,x\,\text{Cosh}[c+d\,x]}{b\,d^2}+\frac{(-a)^{3/2}\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^{5/2}}-$$
$$\frac{(-a)^{3/2}\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^{5/2}}+\frac{2\,\text{Sinh}[c+d\,x]}{b\,d^3}-\frac{a\,\text{Sinh}[c+d\,x]}{b^2\,d}+$$
$$\frac{x^2\,\text{Sinh}[c+d\,x]}{b\,d}-\frac{(-a)^{3/2}\,\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^{5/2}}-$$
$$\frac{(-a)^{3/2}\,\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^{5/2}}$$

Result (type 4, 274 leaves):

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

Problem 58: Result unnecessarily involves imaginary or complex numbers.

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

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

$$-\frac{\text{Cosh}[c+d\,x]}{b\,d^2}-\frac{a\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^2}-$$
$$\frac{a\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^2}+\frac{x\,\text{Sinh}[c+d\,x]}{b\,d}+$$
$$\frac{a\,\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^2}-\frac{a\,\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^2}$$

Result (type 4, 210 leaves):

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

Problem 59: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 226 leaves, 11 steps):

$$\frac{\sqrt{-a}\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^{3/2}}-$$
$$\frac{\sqrt{-a}\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^{3/2}}+$$
$$\frac{\text{Sinh}[c+d\,x]}{b\,d}-\frac{\sqrt{-a}\,\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^{3/2}}-$$
$$\frac{\sqrt{-a}\,\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^{3/2}}$$

Result (type 4, 213 leaves):

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

Problem 60: Result unnecessarily involves imaginary or complex numbers.

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

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

$$\frac{\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b}+\frac{\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b}-$$
$$\frac{\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b}+\frac{\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b}$$

Result (type 4, 171 leaves):

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

Problem 61: Result unnecessarily involves imaginary or complex numbers.

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

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

$$\frac{\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\sqrt{-a}\,\sqrt{b}}-\frac{\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\sqrt{-a}\,\sqrt{b}}-$$
$$\frac{\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\sqrt{-a}\,\sqrt{b}}-\frac{\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\sqrt{-a}\,\sqrt{b}}$$

Result (type 4, 180 leaves):

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

Problem 62: Result unnecessarily involves imaginary or complex numbers.

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

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

$$\frac{\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]}{a}-\frac{\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,a}-\frac{\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,a}+\frac{\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]}{a}+\frac{\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,a}-\frac{\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,a}$$

Result (type 4, 187 leaves):

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

Problem 63: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 249 leaves, 14 steps):

$$-\frac{\text{Cosh}[c+d\,x]}{a\,x}+\frac{\sqrt{b}\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,(-a)^{3/2}}-\frac{\sqrt{b}\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,(-a)^{3/2}}+\frac{d\,\text{CoshIntegral}[d\,x]\,\text{Sinh}[c]}{a}+\frac{d\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]}{a}-\frac{\sqrt{b}\,\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,(-a)^{3/2}}-\frac{\sqrt{b}\,\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,(-a)^{3/2}}$$

Result (type 4, 243 leaves):

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

Problem 64: Result unnecessarily involves imaginary or complex numbers.

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

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

$$-\frac{\text{Cosh}[c+d\,x]}{2\,a\,x^2}-\frac{b\,\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]}{a^2}+\frac{d^2\,\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]}{2\,a}+$$
$$\frac{b\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,a^2}+\frac{b\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,a^2}-$$
$$\frac{d\,\text{Sinh}[c+d\,x]}{2\,a\,x}-\frac{b\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]}{a^2}+\frac{d^2\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]}{2\,a}-$$
$$\frac{b\,\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,a^2}+\frac{b\,\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,a^2}$$

Result (type 4, 257 leaves):

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

Problem 65: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 449 leaves, 24 steps):

$$\frac{x\cosh[c+d\,x]}{2\,b^2}-\frac{x^3\cosh[c+d\,x]}{2\,b\left(a+b\,x^2\right)}+\frac{3\sqrt{-a}\,\cosh\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,b^{5/2}}-$$
$$\frac{3\sqrt{-a}\,\cosh\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,b^{5/2}}-$$
$$\frac{a\,d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\sinh\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,b^3}-\frac{a\,d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\sinh\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,b^3}+$$
$$\frac{\sinh[c+d\,x]}{b^2\,d}+\frac{a\,d\,\cosh\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,b^3}-$$
$$\frac{3\sqrt{-a}\,\sinh\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,b^{5/2}}-$$
$$\frac{a\,d\,\cosh\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,b^3}-\frac{3\sqrt{-a}\,\sinh\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,b^{5/2}}$$

Result (type 4, 621 leaves):

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

Problem 66: Result unnecessarily involves imaginary or complex numbers.

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

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

$$\frac{\text{Cosh}[c+d\,x]}{2\,b^2}-\frac{x^2\,\text{Cosh}[c+d\,x]}{2\,b\left(a+b\,x^2\right)}+\frac{\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^2}+$$
$$\frac{\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^2}-\frac{\sqrt{-a}\,d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,b^{5/2}}+$$
$$\frac{\sqrt{-a}\,d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,b^{5/2}}-$$
$$\frac{\sqrt{-a}\,d\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,b^{5/2}}-\frac{\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{2\,b^2}-$$
$$\frac{\sqrt{-a}\,d\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,b^{5/2}}+\frac{\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{2\,b^2}$$

Result (type 4, 582 leaves):

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

Problem 67: Result unnecessarily involves imaginary or complex numbers.

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

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

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

$$\frac{\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,\sqrt{-a}\,b^{3/2}}+\frac{d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\,\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,b^2}+$$

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

$$\frac{d\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,b^2}-\frac{\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,\sqrt{-a}\,b^{3/2}}+$$

$$\frac{d\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,b^2}-\frac{\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,\sqrt{-a}\,b^{3/2}}$$

Result (type 4, 364 leaves):

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

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

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

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

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

Problem 68: Result unnecessarily involves imaginary or complex numbers.

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

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

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

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

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

Result (type 4, 239 leaves):

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

Problem 69: Result unnecessarily involves imaginary or complex numbers.

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

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

$$-\frac{\text{Cosh}[c+d\,x]}{4\,a\sqrt{b}\left(\sqrt{-a}-\sqrt{b}\,x\right)}+\frac{\text{Cosh}[c+d\,x]}{4\,a\sqrt{b}\left(\sqrt{-a}+\sqrt{b}\,x\right)}-\frac{\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,(-a)^{3/2}\sqrt{b}}+\frac{\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,(-a)^{3/2}\sqrt{b}}-\frac{d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,a\,b}-\frac{d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{4\,a\,b}+\frac{d\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,a\,b}+\frac{\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{4\,(-a)^{3/2}\sqrt{b}}-\frac{d\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,a\,b}+\frac{\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,(-a)^{3/2}\sqrt{b}}$$

Result (type 4, 590 leaves):

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

Problem 70: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

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

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

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

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

Result (type 4, 2464 leaves) :

$$\text{Sinh}[c]\left(\frac{\text{SinhIntegral}[d\,x]}{a^2}-\frac{1}{2\,a^2}\right.$$

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

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

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

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

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

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

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

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

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

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

$$\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\Big]\Big)\Big)-\frac{1}{2\,a^2}$$

$$\Big(\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{CoshIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}+d\,x\Big]-i\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}+d\,x\Big]\Big)\Big)+$$

$$\frac{1}{2}\Big(-\text{Cosh}[c]\,\Big(\frac{\text{SinhIntegral}[d\,x]}{a^2}-\frac{1}{2\,a^2}\Big(-i\,\text{CoshIntegral}\Big[d\,\Big(\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]+$$

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

$$i\sqrt{b}\,\Big(-\frac{\text{Sinh}[d\,x]}{i\sqrt{a}\,\sqrt{b}+b\,x}+\frac{1}{b}d\,\Big(\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{CoshIntegral}\Big[d\,\Big(\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]-$$

$$i\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[d\,\Big(\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]\Big)\Big)\Big)+\frac{1}{2\,a^2}\Big(-i$$

$$\text{CoshIntegral}\Big[-\frac{i\sqrt{a}\,d}{\sqrt{b}}+d\,x\Big]\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]+\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\Big]\Big)+$$

$$\frac{1}{4\,a^{3/2}}i\sqrt{b}\,\Big(-\frac{\text{Sinh}[d\,x]}{-i\sqrt{a}\,\sqrt{b}+b\,x}+\frac{1}{b}d\,\Big(\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{CoshIntegral}\Big[d\,\Big(-\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]-$$

$$i\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\Big]\Big)\Big)\Big)-$$

$$\text{Sinh}[c]\,\Big(\frac{\text{CoshIntegral}[d\,x]}{a^2}-\frac{1}{4\,a^{3/2}}i\sqrt{b}\,\Big(-\frac{\text{Cosh}[d\,x]}{i\sqrt{a}\,\sqrt{b}+b\,x}+\frac{1}{b}d\,\Big(-i\,\text{CoshIntegral}\Big[d$$

$$\Big(\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]+\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[d\,\Big(\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]\Big)\Big)-\frac{1}{2\,a^2}$$

$$\Big(\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{CoshIntegral}\Big[-\frac{i\sqrt{a}\,d}{\sqrt{b}}+d\,x\Big]-i\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\Big]\Big)+$$

$$\frac{1}{4\,a^{3/2}}i\sqrt{b}\,\Big(-\frac{\text{Cosh}[d\,x]}{-i\sqrt{a}\,\sqrt{b}+b\,x}-\frac{1}{b}d\,\Big(-i\,\text{CoshIntegral}\Big[d\,\Big(-\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]+$$

$$\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\Big]\Big)\Big)-\frac{1}{2\,a^2}$$

$$\Big(\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{CoshIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}+d\,x\Big]-i\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{SinhIntegral}\Big[\frac{i\sqrt{a}\,d}{\sqrt{b}}+d\,x\Big]\Big)\Big)\Big)+$$

$$\frac{1}{2}\Big(\text{Cosh}[c]\,\Big(\frac{\text{SinhIntegral}[d\,x]}{a^2}-\frac{1}{2\,a^2}\Big(-i\,\text{CoshIntegral}\Big[d\,\Big(\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]\,\text{Sin}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]+$$

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

$$i\sqrt{b}\,\Big(-\frac{\text{Sinh}[d\,x]}{i\sqrt{a}\,\sqrt{b}+b\,x}+\frac{1}{b}d\,\Big(\text{Cos}\Big[\frac{\sqrt{a}\,d}{\sqrt{b}}\Big]\,\text{CoshIntegral}\Big[d\,\Big(\frac{i\sqrt{a}}{\sqrt{b}}+x\Big)\Big]-$$

$$i \operatorname{Sin}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\Bigg)\Bigg)+\frac{1}{2a^2}\Bigg(-i$$

$$\operatorname{CoshIntegral}\left[-\frac{i\sqrt{a}\, d}{\sqrt{b}}+d x\right] \operatorname{Sin}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right]+\operatorname{Cos}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinhIntegral}\left[\frac{i\sqrt{a}\, d}{\sqrt{b}}-d x\right]\Bigg)+$$

$$\frac{1}{4a^{3/2}} i\sqrt{b}\Bigg(-\frac{\operatorname{Sinh}[d x]}{-i\sqrt{a}\sqrt{b}+b x}+\frac{1}{b} d\Bigg(\operatorname{Cos}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{CoshIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]-$$

$$i \operatorname{Sin}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinhIntegral}\left[\frac{i\sqrt{a}\, d}{\sqrt{b}}-d x\right]\Bigg)\Bigg)\Bigg)+$$

$$\operatorname{Sinh}[c]\Bigg(\frac{\operatorname{CoshIntegral}[d x]}{a^2}-\frac{1}{4a^{3/2}} i\sqrt{b}\Bigg(-\frac{\operatorname{Cosh}[d x]}{i\sqrt{a}\sqrt{b}+b x}+\frac{1}{b} d\Bigg(-i \operatorname{CoshIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right] \operatorname{Sin}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right]+\operatorname{Cos}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\Bigg)\Bigg)-\frac{1}{2a^2}$$

$$\Bigg(\operatorname{Cos}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{CoshIntegral}\left[-\frac{i\sqrt{a}\, d}{\sqrt{b}}+d x\right]-i \operatorname{Sin}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinhIntegral}\left[\frac{i\sqrt{a}\, d}{\sqrt{b}}-d x\right]\Bigg)+$$

$$\frac{1}{4a^{3/2}} i\sqrt{b}\Bigg(-\frac{\operatorname{Cosh}[d x]}{-i\sqrt{a}\sqrt{b}+b x}-\frac{1}{b} d\Bigg(-i \operatorname{CoshIntegral}\left[d\left(-\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right] \operatorname{Sin}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right]+$$

$$\operatorname{Cos}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinhIntegral}\left[\frac{i\sqrt{a}\, d}{\sqrt{b}}-d x\right]\Bigg)\Bigg)-\frac{1}{2a^2}$$

$$\Bigg(\operatorname{Cos}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{CoshIntegral}\left[\frac{i\sqrt{a}\, d}{\sqrt{b}}+d x\right]-i \operatorname{Sin}\left[\frac{\sqrt{a}\, d}{\sqrt{b}}\right] \operatorname{SinhIntegral}\left[\frac{i\sqrt{a}\, d}{\sqrt{b}}+d x\right]\Bigg)\Bigg)\Bigg)$$

Problem 71: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 500 leaves, 32 steps):

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

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

$$\frac{3\sqrt{b}\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,(-a)^{5/2}}+\frac{d\,\text{CoshIntegral}[d\,x]\,\text{Sinh}[c]}{a^2}+$$

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

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

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

$$\frac{d\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,a^2}+\frac{3\sqrt{b}\,\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{4\,(-a)^{5/2}}$$

Result (type 4, 675 leaves) :

$$\frac{1}{4\,a^{5/2}\,x\,\left(a+b\,x^2\right)}\left(-4\,a^{3/2}\,\text{Cosh}[c+d\,x]-6\,\sqrt{a}\,b\,x^2\,\text{Cosh}[c+d\,x]+4\,a^{3/2}\,d\,x\,\text{CoshIntegral}[d\,x]\,\text{Sinh}[c]+4\,\sqrt{a}\,b\,d\,x^3\,\text{CoshIntegral}[d\,x]\,\text{Sinh}[c]+x\,\left(a+b\,x^2\right)\,\text{CosIntegral}\left[-\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\left(-3\,i\,\sqrt{b}\,\text{Cosh}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]+\sqrt{a}\,d\,\text{Sinh}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\right)+x\,\left(a+b\,x^2\right)\,\text{CosIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\left(3\,i\,\sqrt{b}\,\text{Cosh}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]+\sqrt{a}\,d\,\text{Sinh}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\right)+4\,a^{3/2}\,d\,x\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]+4\,\sqrt{a}\,b\,d\,x^3\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]+i\,a^{3/2}\,d\,x\,\text{Cosh}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]+i\,\sqrt{a}\,b\,d\,x^3\,\text{Cosh}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]+3\,a\,\sqrt{b}\,x\,\text{Sinh}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]+3\,b^{3/2}\,x^3\,\text{Sinh}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]-i\,a^{3/2}\,d\,x\,\text{Cosh}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]-i\,\sqrt{a}\,b\,d\,x^3\,\text{Cosh}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]+3\,a\,\sqrt{b}\,x\,\text{Sinh}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]+3\,b^{3/2}\,x^3\,\text{Sinh}\left[c+\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\right)$$

Problem 72: Result unnecessarily involves imaginary or complex numbers.

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

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

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

$$\frac{d^2 \text{Cosh}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{CoshIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 b^3}-\frac{3 d \text{CoshIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right] \text{Sinh}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right]}{16 \sqrt{-a} b^{5/2}}+$$

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

$$\frac{3 d \text{Cosh}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinhIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 \sqrt{-a} b^{5/2}}-\frac{d^2 \text{Sinh}\left[c+\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinhIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}-d x\right]}{16 b^3}-$$

$$\frac{3 d \text{Cosh}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinhIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 \sqrt{-a} b^{5/2}}+\frac{d^2 \text{Sinh}\left[c-\frac{\sqrt{-a} d}{\sqrt{b}}\right] \text{SinhIntegral}\left[\frac{\sqrt{-a} d}{\sqrt{b}}+d x\right]}{16 b^3}$$

Result (type 4, 648 leaves) :

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

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

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

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

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

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

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

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

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

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

Problem 73: Result unnecessarily involves imaginary or complex numbers.

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

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

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

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

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

$$\frac{d^2\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\sqrt{-a}\,b^{5/2}}-\frac{d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,a\,b^2}-$$

$$\frac{d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,a\,b^2}-\frac{d\,\text{Sinh}[c+d\,x]}{8\,b^2\,(a+b\,x^2)}+$$

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

$$\frac{d^2\,\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\sqrt{-a}\,b^{5/2}}-\frac{d\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,a\,b^2}+$$

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

Result (type 4, 932 leaves):

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

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

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

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

$$\frac{2\,a^{5/2}\,d\,\text{Cosh}[c]\,\text{Sinh}[d\,x]}{(a+b\,x^2)^2}-\frac{2\,a^{3/2}\,b\,d\,x^2\,\text{Cosh}[c]\,\text{Sinh}[d\,x]}{(a+b\,x^2)^2}-\frac{2\,a^{3/2}\,b\,x\,\text{Sinh}[c]\,\text{Sinh}[d\,x]}{(a+b\,x^2)^2}+$$

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

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

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

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

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

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

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

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

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

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

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

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

Problem 74: Result unnecessarily involves imaginary or complex numbers.

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

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

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

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

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

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

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

Result (type 4, 637 leaves) :

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

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

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

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

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

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

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

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

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

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

Problem 75: Result unnecessarily involves imaginary or complex numbers.

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

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

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

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

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

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

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

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

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

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

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

Result (type 4, 933 leaves):

$$\frac{1}{16\,a^2\,b^{3/2}}\left(\frac{10\,a\,b^{3/2}\,x\,\text{Cosh}[c]\,\text{Cosh}[d\,x]}{\left(a+b\,x^2\right)^2}+\frac{6\,b^{5/2}\,x^3\,\text{Cosh}[c]\,\text{Cosh}[d\,x]}{\left(a+b\,x^2\right)^2}+\right.$$

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

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

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

Problem 76: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

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

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

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

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

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

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

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

Result (type 4, 1558 leaves):

$$\frac{1}{16\,a^3\,b\,\left(a+b\,x^2\right)^2}$$

$$\left(12\,a^2\,b\,\text{Cosh}[c+d\,x]+8\,a\,b^2\,x^2\,\text{Cosh}[c+d\,x]+16\,b\,\left(a+b\,x^2\right)^2\,\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]-\right.$$

$$8\,a^2\,b\,\text{Cosh}\left[c-\frac{i\,\sqrt{a}\,d}{\sqrt{b}}\right]\text{CoshIntegral}\left[d\left(\frac{i\,\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$

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

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

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

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

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

$$10\,i\,a^{3/2}b^{3/2}\,d\,x^2\,\text{CoshIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]-$$

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

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

$$\left(\left(-8\,b+a\,d^2\right)\text{Cosh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]+5\,i\,\sqrt{a}\,\sqrt{b}\,d\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\right)-$$

$$2\,a^2\,b\,d\,x\,\text{Sinh}[c+d\,x]-2\,a\,b^2\,d\,x^3\,\text{Sinh}[c+d\,x]+16\,a^2\,b\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]+$$

$$32\,a\,b^2\,x^2\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]+16\,b^3\,x^4\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]-$$

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

$$10\,i\,a^{3/2}b^{3/2}\,d\,x^2\,\text{Cosh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]-$$

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

$$8\,a^2\,b\,\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$

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

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

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

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

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

$$5\,i\,a^{5/2}\sqrt{b}\,d\,\text{Cosh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$

$$10\,i\,a^{3/2}b^{3/2}\,d\,x^2\,\text{Cosh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$

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

$$8\,a^2\,b\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$
$$a^3\,d^2\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$
$$16\,a\,b^2\,x^2\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$
$$2\,a^2\,b\,d^2\,x^2\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$
$$8\,b^3\,x^4\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$
$$a\,b^2\,d^2\,x^4\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\Bigg)$$

Problem 77: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 874 leaves, 60 steps):

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

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

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

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

$$\frac{7\,d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]\text{Sinh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,a^3}+\frac{7\,d\,\text{CoshIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]}{16\,a^3}+$$

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

$$\frac{d\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]}{a^3}-\frac{7\,d\,\text{Cosh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,a^3}-$$

$$\frac{15\sqrt{b}\,\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,(-a)^{7/2}}-$$

$$\frac{d^2\,\text{Sinh}\left[c+\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}-d\,x\right]}{16\,(-a)^{5/2}\sqrt{b}}+\frac{7\,d\,\text{Cosh}\left[c-\frac{\sqrt{-a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{\sqrt{-a}\,d}{\sqrt{b}}+d\,x\right]}{16\,a^3}-$$

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

Result (type 4, 1359 leaves) :

$$\frac{1}{16\,a^{7/2}\sqrt{b}\,x\left(a+b\,x^2\right)^2}$$

$$\left(-16\,a^{5/2}\sqrt{b}\,\text{Cosh}[c+d\,x]-50\,a^{3/2}\,b^{3/2}\,x^2\,\text{Cosh}[c+d\,x]-30\sqrt{a}\,b^{5/2}\,x^4\,\text{Cosh}[c+d\,x]+\right.$$

$$16\,a^{5/2}\sqrt{b}\,d\,x\,\text{CoshIntegral}[d\,x]\,\text{Sinh}[c]+32\,a^{3/2}\,b^{3/2}\,d\,x^3\,\text{CoshIntegral}[d\,x]\,\text{Sinh}[c]+$$

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

$$\left(-i\left(15\,b-a\,d^2\right)\text{Cosh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]+7\sqrt{a}\,\sqrt{b}\,d\,\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\right)+$$

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

$$\left(i\left(15\,b-a\,d^2\right)\,\text{Cosh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]+7\sqrt{a}\,\sqrt{b}\,d\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\right)-$$
$$2\,a^{5/2}\sqrt{b}\,d\,x\,\text{Sinh}[c+d\,x]-2\,a^{3/2}\,b^{3/2}\,d\,x^3\,\text{Sinh}[c+d\,x]+$$
$$16\,a^{5/2}\sqrt{b}\,d\,x\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]+32\,a^{3/2}\,b^{3/2}\,d\,x^3\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]+$$
$$16\sqrt{a}\,b^{5/2}\,d\,x^5\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]+$$
$$7\,a^{5/2}\sqrt{b}\,d\,x\,\text{Cosh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$
$$14\,a^{3/2}\,b^{3/2}\,d\,x^3\,\text{Cosh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$
$$7\sqrt{a}\,b^{5/2}\,d\,x^5\,\text{Cosh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]-$$
$$15\,i\,a^2\,b\,x\,\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$
$$i\,a^3\,d^2\,x\,\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]-$$
$$30\,i\,a\,b^2\,x^3\,\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$
$$2\,i\,a^2\,b\,d^2\,x^3\,\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]-$$
$$15\,i\,b^3\,x^5\,\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]+$$
$$i\,a\,b^2\,d^2\,x^5\,\text{Sinh}\left[c-\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[d\left(\frac{i\sqrt{a}}{\sqrt{b}}+x\right)\right]-$$
$$7\,a^{5/2}\sqrt{b}\,d\,x\,\text{Cosh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$
$$14\,a^{3/2}\,b^{3/2}\,d\,x^3\,\text{Cosh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$
$$7\sqrt{a}\,b^{5/2}\,d\,x^5\,\text{Cosh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$
$$15\,i\,a^2\,b\,x\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$
$$i\,a^3\,d^2\,x\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$
$$30\,i\,a\,b^2\,x^3\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$
$$2\,i\,a^2\,b\,d^2\,x^3\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\,\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]-$$

$$15\,i\,b^3\,x^5\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]+$$
$$i\,a\,b^2\,d^2\,x^5\,\text{Sinh}\left[c+\frac{i\sqrt{a}\,d}{\sqrt{b}}\right]\text{SinhIntegral}\left[\frac{i\sqrt{a}\,d}{\sqrt{b}}-d\,x\right]\Bigg)$$

Problem 78: Result unnecessarily involves imaginary or complex numbers.

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

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

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

Result (type 4, 998 leaves):

$$-\frac{1}{16\,a^4}\left(\frac{1}{x^2\left(a+b\,x^2\right)^2}2\,a\,\text{Cosh}[d\,x]\right.$$
$$\left(2\left(2\,a^2+9\,a\,b\,x^2+6\,b^2\,x^4\right)\text{Cosh}[c]+d\,x\left(4\,a^2+7\,a\,b\,x^2+3\,b^2\,x^4\right)\text{Sinh}[c]\right)+\frac{1}{x^2\left(a+b\,x^2\right)^2}$$
$$2\,a\left(d\,x\left(4\,a^2+7\,a\,b\,x^2+3\,b^2\,x^4\right)\text{Cosh}[c]+2\left(2\,a^2+9\,a\,b\,x^2+6\,b^2\,x^4\right)\text{Sinh}[c]\right)\text{Sinh}[d\,x]+$$
$$8\left(6\,b-a\,d^2\right)\left(\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]+\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]\right)-9\,i\,\sqrt{a}\,\sqrt{b}\,d$$
$$\text{Sinh}[c]\left(\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[-\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]-\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]+\right.$$
$$\left.\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]-\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\right)\right)+24\,i\,b\,\text{Sinh}[c]$$
$$\left(\text{CosIntegral}\left[-\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]-\text{CosIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\right.$$
$$\left.\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(-\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]+\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\right)\right)-i\,a\,d^2\,\text{Sinh}[c]$$
$$\left(\text{CosIntegral}\left[-\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]-\text{CosIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\right.$$
$$\left.\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(-\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]+\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\right)\right)-9\,\sqrt{a}\,\sqrt{b}\,d$$
$$\text{Cosh}[c]\left(\text{CosIntegral}\left[-\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]+\text{CosIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]-\right.$$
$$\left.\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]+\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\right)\right)-24\,b\,\text{Cosh}[c]$$
$$\left(\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[-\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]+\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]+\right.$$
$$\left.\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]+\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\right)\right)+a\,d^2\,\text{Cosh}[c]$$
$$\left(\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[-\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]+\text{Cos}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\text{CosIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]+\right.$$
$$\left.\left.\text{Sin}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}\right]\left(\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}-i\,d\,x\right]+\text{SinIntegral}\left[\frac{\sqrt{a}\,d}{\sqrt{b}}+i\,d\,x\right]\right)\right)\right)$$

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

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

Optimal (type 4, 373 leaves, 15 steps):

$$-\frac{\text{Cosh}[c+d\,x]}{b\,d^2}+\frac{(-1)^{2/3}\,a^{2/3}\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{3\,b^{5/3}}-$$
$$\frac{(-1)^{1/3}\,a^{2/3}\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{3\,b^{5/3}}+$$
$$\frac{a^{2/3}\,\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{3\,b^{5/3}}+\frac{x\,\text{Sinh}[c+d\,x]}{b\,d}-$$
$$\frac{(-1)^{2/3}\,a^{2/3}\,\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{3\,b^{5/3}}+$$
$$\frac{a^{2/3}\,\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{3\,b^{5/3}}-$$
$$\frac{(-1)^{1/3}\,a^{2/3}\,\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{3\,b^{5/3}}$$

Result (type 7, 213 leaves):

$$-\frac{1}{6\,b^2\,d^2}\left(a\,d^2\,\text{RootSum}\left[a+b\,\#1^3\,\&,\right.\right.$$
$$\frac{1}{\#1}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\,(x-\#1)\right]-\text{CoshIntegral}\left[d\,(x-\#1)\right]\,\text{Sinh}[c+d\,\#1]-\right.$$
$$\left.\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,(x-\#1)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,(x-\#1)\right]\right)\&\Big]+$$
$$a\,d^2\,\text{RootSum}\left[a+b\,\#1^3\,\&,\,\frac{1}{\#1}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\,(x-\#1)\right]+\right.\right.$$
$$\text{CoshIntegral}\left[d\,(x-\#1)\right]\,\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,(x-\#1)\right]+$$
$$\left.\left.\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,(x-\#1)\right]\right)\&\Big]+6\,b\,\left(\text{Cosh}[c+d\,x]-d\,x\,\text{Sinh}[c+d\,x]\right)\Big)$$

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

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

Optimal (type 4, 358 leaves, 14 steps):

$$\frac{(-1)^{1/3} a^{1/3} \text{Cosh}\left[c + \frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{CoshIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}} - d x\right]}{3 b^{4/3}} -$$
$$\frac{(-1)^{2/3} a^{1/3} \text{Cosh}\left[c - \frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{CoshIntegral}\left[-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}} - d x\right]}{3 b^{4/3}} -$$
$$\frac{a^{1/3} \text{Cosh}\left[c - \frac{a^{1/3} d}{b^{1/3}}\right] \text{CoshIntegral}\left[\frac{a^{1/3} d}{b^{1/3}} + d x\right]}{3 b^{4/3}} + \frac{\text{Sinh}[c + d x]}{b d} -$$
$$\frac{(-1)^{1/3} a^{1/3} \text{Sinh}\left[c + \frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}} - d x\right]}{3 b^{4/3}} -$$
$$\frac{a^{1/3} \text{Sinh}\left[c - \frac{a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{a^{1/3} d}{b^{1/3}} + d x\right]}{3 b^{4/3}} -$$
$$\frac{(-1)^{2/3} a^{1/3} \text{Sinh}\left[c - \frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}} + d x\right]}{3 b^{4/3}}$$

Result (type 7, 198 leaves):

$$-\frac{1}{6 b^2 d}\left(a d \,\text{RootSum}\left[a + b \#1^3 \&,\right.\right.$$
$$\frac{1}{\#1^2}\left(\text{Cosh}[c + d \#1] \,\text{CoshIntegral}\left[d\left(x - \#1\right)\right] - \text{CoshIntegral}\left[d\left(x - \#1\right)\right] \text{Sinh}[c + d \#1] -\right.$$
$$\left.\text{Cosh}[c + d \#1] \,\text{SinhIntegral}\left[d\left(x - \#1\right)\right] + \text{Sinh}[c + d \#1] \,\text{SinhIntegral}\left[d\left(x - \#1\right)\right]\right) \&\Big] +$$
$$a d \,\text{RootSum}\left[a + b \#1^3 \&, \frac{1}{\#1^2}\left(\text{Cosh}[c + d \#1] \,\text{CoshIntegral}\left[d\left(x - \#1\right)\right] +\right.\right.$$
$$\text{CoshIntegral}\left[d\left(x - \#1\right)\right] \text{Sinh}[c + d \#1] + \text{Cosh}[c + d \#1] \,\text{SinhIntegral}\left[d\left(x - \#1\right)\right] +$$
$$\left.\left.\left.\text{Sinh}[c + d \#1] \,\text{SinhIntegral}\left[d\left(x - \#1\right)\right]\right) \&\right] - 6 b \,\text{Sinh}[c + d x]\right)$$

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

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

Optimal (type 4, 283 leaves, 11 steps):

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

Result (type 7, 170 leaves):

$$\frac{1}{6\,b}\left(\text{RootSum}\left[a+b\,\#1^3\&,\right.\right.$$
$$\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-$$
$$\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\&\Big]+$$
$$\text{RootSum}\left[a+b\,\#1^3\&,\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+\right.$$
$$\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+$$
$$\left.\left.\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\&\right]\right)$$

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

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

Optimal (type 4, 345 leaves, 11 steps):

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

Result (type 7, 180 leaves):

$$\frac{1}{6\,b}\left(\text{RootSum}\left[a+b\,\#1^3\&,\right.\right.$$
$$\frac{1}{\#1}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-\right.$$
$$\left.\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\right)\&\Big]+$$
$$\text{RootSum}\left[a+b\,\#1^3\&,\,\frac{1}{\#1}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+\right.\right.$$
$$\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+$$
$$\left.\left.\left.\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\right)\&\right]\right)$$

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

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

Optimal (type 4, 345 leaves, 11 steps):

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

Result (type 7, 180 leaves):

$$\frac{1}{6\,b}\left(\text{RootSum}\left[a+b\,\#1^3\,\&,\right.\right.$$
$$\frac{1}{\#1^2}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-\right.$$
$$\left.\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\right)\,\&\Big]+$$
$$\text{RootSum}\left[a+b\,\#1^3\,\&,\,\frac{1}{\#1^2}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+\right.\right.$$
$$\left.\left.\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\right.\right.$$
$$\left.\left.\left.\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\right)\,\&\right]\right)$$

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

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

Optimal (type 4, 303 leaves, 16 steps):

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

Result (type 7, 186 leaves):

$$-\frac{1}{6\,a}\left(-6\,\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]+\text{RootSum}\left[a+b\,\#1^3\&,\right.\right.$$
$$\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-$$
$$\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\&\Big]+$$
$$\text{RootSum}\left[a+b\,\#1^3\&,\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+\right.$$
$$\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+$$
$$\left.\left.\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\&\right]-6\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]\right)$$

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

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

Optimal (type 4, 381 leaves, 17 steps):

$$-\frac{\text{Cosh}[c+d\,x]}{a\,x}+\frac{(-1)^{2/3}b^{1/3}\,\text{Cosh}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{3\,a^{4/3}}-$$
$$\frac{(-1)^{1/3}b^{1/3}\,\text{Cosh}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{3\,a^{4/3}}+$$
$$\frac{b^{1/3}\,\text{Cosh}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{3\,a^{4/3}}+\frac{d\,\text{CoshIntegral}[d\,x]\,\text{Sinh}[c]}{a}+$$
$$\frac{d\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]}{a}-\frac{(-1)^{2/3}b^{1/3}\,\text{Sinh}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{3\,a^{4/3}}+$$
$$\frac{b^{1/3}\,\text{Sinh}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{3\,a^{4/3}}-$$
$$\frac{(-1)^{1/3}b^{1/3}\,\text{Sinh}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]}{3\,a^{4/3}}$$

Result (type 7, 215 leaves):

$$-\frac{1}{6\,a\,x}\left(6\,\text{Cosh}[c+d\,x]+x\,\text{RootSum}\left[a+b\,\#1^3\&,\right.\right.$$
$$\frac{1}{\#1}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-\right.$$
$$\left.\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\right)\&\Big]+$$
$$x\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+\right.\right.$$
$$\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+$$
$$\left.\left.\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\right)\&\right]-$$
$$\left.6\,d\,x\,\text{CoshIntegral}[d\,x]\,\text{Sinh}[c]-6\,d\,x\,\text{Cosh}[c]\,\text{SinhIntegral}[d\,x]\right)$$

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

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

Optimal (type 4, 410 leaves, 18 steps):

$$-\frac{\text{Cosh}[c+d\,x]}{2\,a\,x^2}+\frac{d^2\,\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]}{2\,a}+$$
$$\frac{(-1)^{1/3}\,b^{2/3}\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{3\,a^{5/3}}-$$
$$\frac{(-1)^{2/3}\,b^{2/3}\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{3\,a^{5/3}}-$$
$$\frac{b^{2/3}\,\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{3\,a^{5/3}}-\frac{d\,\text{Sinh}[c+d\,x]}{2\,a\,x}+\frac{d^2\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]}{2\,a}-$$
$$\frac{(-1)^{1/3}\,b^{2/3}\,\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{3\,a^{5/3}}-$$
$$\frac{b^{2/3}\,\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{3\,a^{5/3}}-$$
$$\frac{(-1)^{2/3}\,b^{2/3}\,\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{3\,a^{5/3}}$$

Result (type 7, 237 leaves):

$$-\frac{1}{6\,a\,x^2}\left(3\,\text{Cosh}[c+d\,x]-3\,d^2\,x^2\,\text{Cosh}[c]\,\text{CoshIntegral}[d\,x]+x^2\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\right)\&\right]+x^2\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\right)\&\right]+3\,d\,x\,\text{Sinh}[c+d\,x]-3\,d^2\,x^2\,\text{Sinh}[c]\,\text{SinhIntegral}[d\,x]\right)$$

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

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

Optimal (type 4, 718 leaves, 23 steps):

$$-\frac{x\,\text{Cosh}[c+d\,x]}{3\,b\,\left(a+b\,x^3\right)}-\frac{(-1)^{1/3}\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\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}\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{2/3}\,b^{4/3}}+\frac{\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{2/3}\,b^{4/3}}-\frac{d\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{1/3}\,b^{5/3}}-\frac{(-1)^{2/3}\,d\,\text{CoshIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{1/3}\,b^{5/3}}+\frac{(-1)^{1/3}\,d\,\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\,\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{1/3}\,b^{5/3}}+\frac{(-1)^{2/3}\,d\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{1/3}\,b^{5/3}}+\frac{(-1)^{1/3}\,\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{2/3}\,b^{4/3}}-\frac{d\,\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{1/3}\,b^{5/3}}+\frac{\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{2/3}\,b^{4/3}}+\frac{(-1)^{1/3}\,d\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{1/3}\,b^{5/3}}+\frac{(-1)^{2/3}\,\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{2/3}\,b^{4/3}}$$

Result (type 7, 363 leaves):

$$\frac{1}{18\,b^2}\left(-\frac{6\,b\,x\,\text{Cosh}[c+d\,x]}{a+b\,x^3}-\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(-\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1-d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1-d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1\right)\&\right]+\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1+d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1\right)\&\right]\right)$$

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

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

Optimal (type 4, 373 leaves, 12 steps):

$$-\frac{\text{Cosh}[c+d\,x]}{3\,b\,\left(a+b\,x^3\right)}+\frac{d\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{2/3}\,b^{4/3}}-\frac{(-1)^{1/3}\,d\,\text{CoshIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{2/3}\,b^{4/3}}+\frac{(-1)^{2/3}\,d\,\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{2/3}\,b^{4/3}}+\frac{(-1)^{1/3}\,d\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{2/3}\,b^{4/3}}+\frac{d\,\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{2/3}\,b^{4/3}}+\frac{(-1)^{2/3}\,d\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{2/3}\,b^{4/3}}$$

Result (type 7, 203 leaves):

$$\frac{1}{18\,b^2}\left(-\frac{6\,b\,\text{Cosh}[c+d\,x]}{a+b\,x^3}-d\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\,(x-\#1)\right]-\text{CoshIntegral}\left[d\,(x-\#1)\right]\text{Sinh}[c+d\,\#1]-\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,(x-\#1)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,(x-\#1)\right]\right)\&\right]+d\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\,(x-\#1)\right]+\text{CoshIntegral}\left[d\,(x-\#1)\right]\text{Sinh}[c+d\,\#1]+\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,(x-\#1)\right]+\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,(x-\#1)\right]\right)\&\right]\right)$$

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

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

Optimal (type 4, 695 leaves, 34 steps):

$$\frac{\text{Cosh}[c+d\,x]}{3\,a\,b\,x}-\frac{\text{Cosh}[c+d\,x]}{3\,b\,x\left(a+b\,x^3\right)}-\frac{(-1)^{2/3}\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{4/3}\,b^{2/3}}+\frac{(-1)^{1/3}\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a^{4/3}\,b^{2/3}}-\frac{\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{4/3}\,b^{2/3}}-\frac{d\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{9\,a\,b}-\frac{d\,\text{CoshIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{9\,a\,b}-\frac{d\,\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]}{9\,a\,b}+\frac{d\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{9\,a\,b}+\frac{(-1)^{2/3}\,\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\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{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a\,b}-\frac{\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{4/3}\,b^{2/3}}-\frac{d\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a\,b}+\frac{(-1)^{1/3}\,\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\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, 387 leaves):

$$\frac{1}{18\,a\,b\,\left(a+b\,x^3\right)}\left(6\,b\,x^2\,\text{Cosh}\left[c+d\,x\right]+\left(a+b\,x^3\right)\,\text{RootSum}\left[a+b\,\#1^3\&,\,\frac{1}{\#1}\left(\text{Cosh}\left[c+d\,\#1\right]\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]-\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\text{Sinh}\left[c+d\,\#1\right]-\text{Cosh}\left[c+d\,\#1\right]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]+\text{Sinh}\left[c+d\,\#1\right]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]+d\,\text{Cosh}\left[c+d\,\#1\right]\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1-d\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\text{Sinh}\left[c+d\,\#1\right]\,\#1-d\,\text{Cosh}\left[c+d\,\#1\right]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1+d\,\text{Sinh}\left[c+d\,\#1\right]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1\right)\&\right]-\left(a+b\,x^3\right)\,\text{RootSum}\left[a+b\,\#1^3\&,\,\frac{1}{\#1}\left(-\text{Cosh}\left[c+d\,\#1\right]\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]-\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\text{Sinh}\left[c+d\,\#1\right]-\text{Cosh}\left[c+d\,\#1\right]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]-\text{Sinh}\left[c+d\,\#1\right]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]+d\,\text{Cosh}\left[c+d\,\#1\right]\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1+d\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\text{Sinh}\left[c+d\,\#1\right]\,\#1+d\,\text{Cosh}\left[c+d\,\#1\right]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1\right)\&\right]\right)$$

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

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

Optimal (type 4, 739 leaves, 36 steps):

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

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

$$\frac{2\,\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{5/3}\,b^{1/3}}+\frac{d\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]\,\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]}{9\,a^{4/3}\,b^{2/3}}+$$

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

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

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

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

$$\frac{d\,\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{4/3}\,b^{2/3}}+\frac{2\,\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{9\,a^{5/3}\,b^{1/3}}-$$

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

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

Result (type 7, 387 leaves):

$$\frac{1}{18\,a\,b\,\left(a+b\,x^3\right)}\Bigg(6\,b\,x\,\text{Cosh}[c+d\,x]+$$

$$\left(a+b\,x^3\right)\,\text{RootSum}\left[a+b\,\#1^3\&,\,\frac{1}{\#1^2}\left(2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]-\right.\right.$$
$$2\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\text{Sinh}[c+d\,\#1]-2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]+$$
$$2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]+d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]$$
$$\#1-d\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\text{Sinh}[c+d\,\#1]\,\#1-d\,\text{Cosh}[c+d\,\#1]$$
$$\left.\left.\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1+d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1\right)\&\right]-$$

$$\left(a+b\,x^3\right)\,\text{RootSum}\left[a+b\,\#1^3\&,\,\frac{1}{\#1^2}\left(-2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]-\right.\right.$$
$$2\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\text{Sinh}[c+d\,\#1]-2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]-$$
$$2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]+d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]$$
$$\#1+d\,\text{CoshIntegral}\left[d\,\left(x-\#1\right)\right]\,\text{Sinh}[c+d\,\#1]\,\#1+d\,\text{Cosh}[c+d\,\#1]$$
$$\left.\left.\left.\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1+d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\,\left(x-\#1\right)\right]\,\#1\right)\&\right]\Bigg)$$

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

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

Optimal (type 4, 697 leaves, 41 steps):

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

Result (type 4, 5530 leaves):

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

$$\left(\left(21-22\left(-1\right)^{1/3}+21\left(-1\right)^{2/3}\right)b^{1/3}\left(-\frac{\text{Sinh}[d\,x]}{b^{1/3}\left(-\left(-1\right)^{1/3}a^{1/3}+b^{1/3}x\right)}+\frac{1}{b^{2/3}}\right.\right.$$
$$d\left(\text{Cosh}\left[\frac{\left(-1\right)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{\left(-1\right)^{1/3}a^{1/3}d}{b^{1/3}}+d\,x\right]-\right.$$
$$\left.\left.\left.\text{Sinh}\left[\frac{\left(-1\right)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{\left(-1\right)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\right)\right)\right)\Big/$$
$$\left(3\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2a^{5/3}\right)+\left(\left(22-21\left(-1\right)^{1/3}+21\left(-1\right)^{2/3}\right)b^{1/3}\right.$$
$$\left(-\frac{\text{Sinh}[d\,x]}{b^{1/3}\left(a^{1/3}+b^{1/3}x\right)}+\frac{1}{b^{2/3}}d\left(\text{Cosh}\left[\frac{a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]-\right.\right.$$
$$\left.\left.\left.\text{Sinh}\left[\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\right)\right)\right)\Big/\left(3\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2a^{5/3}\right)+$$
$$\left(\left(22\,b^{1/3}-21\left(-1\right)^{1/3}b^{1/3}+21\left(-1\right)^{2/3}b^{1/3}\right)\left(-\frac{\text{Sinh}[d\,x]}{b^{1/3}\left(\left(-1\right)^{2/3}a^{1/3}+b^{1/3}x\right)}+\frac{1}{b^{2/3}}\right.\right.$$
$$d\left(\text{Cosh}\left[\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]-\right.$$
$$\left.\left.\left.\text{Sinh}\left[\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]\right)\right)\right)\Big/$$
$$\left(3\left(1+\left(-1\right)^{1/3}\right)^2a^{5/3}\right)+\left(i\left(2\,b^{1/3}-3\left(-1\right)^{1/3}b^{1/3}+3\left(-1\right)^{2/3}b^{1/3}\right)\right.$$
$$\left(\text{CosIntegral}\left[-\frac{\left(-1\right)^{1/6}a^{1/3}d}{b^{1/3}}+i\,d\,x\right]\text{Sin}\left[\frac{\left(-1\right)^{1/6}a^{1/3}d}{b^{1/3}}\right]-\right.$$
$$\left.\left.\text{Cos}\left[\frac{\left(-1\right)^{1/6}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{\left(-1\right)^{1/6}a^{1/3}d}{b^{1/3}}-i\,d\,x\right]\right)\right)\Big/$$
$$\left(\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2a^2b^{1/3}\right)+\left(i\left(3\,b^{1/3}-2\left(-1\right)^{1/3}b^{1/3}+3\left(-1\right)^{2/3}b^{1/3}\right)\right.$$
$$\left(\text{CosIntegral}\left[-\frac{\left(-1\right)^{5/6}a^{1/3}d}{b^{1/3}}+i\,d\,x\right]\text{Sin}\left[\frac{\left(-1\right)^{5/6}a^{1/3}d}{b^{1/3}}\right]-\right.$$
$$\left.\left.\text{Cos}\left[\frac{\left(-1\right)^{5/6}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{\left(-1\right)^{5/6}a^{1/3}d}{b^{1/3}}-i\,d\,x\right]\right)\right)\Big/\left(\left(1+\left(-1\right)^{1/3}\right)^2a^2b^{1/3}\right)\Bigg)+$$
$$\text{Cosh}[c]\left(\frac{\text{CoshIntegral}[d\,x]}{a^2}+\left(\left(22-21\left(-1\right)^{1/3}+21\left(-1\right)^{2/3}\right)\right.\right.$$
$$\left.\left.\left(-\frac{b^{1/3}\,\text{Cosh}[d\,x]}{a^{1/3}+b^{1/3}x}-d\,\text{CoshIntegral}\left[d\left(\frac{a^{1/3}}{b^{1/3}}+x\right)\right]\text{Sinh}\left[\frac{a^{1/3}d}{b^{1/3}}\right]+\right.\right.$$

$$d \cosh\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[d\left(\frac{a^{1/3}}{b^{1/3}}+x\right)\right]\Bigg)\Bigg)\Bigg/$$

$$\left(3\left(-1+(-1)^{1/3}\right)\left(1+(-1)^{1/3}\right)^2 a^{5/3} b^{1/3}\right)+\Bigg(\left(21-22(-1)^{1/3}+21(-1)^{2/3}\right) b^{1/3}$$

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

$$\left.\left.\left.\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]-\cosh\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]\right)\Bigg)\Bigg)\Bigg/$$

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

$$\left(\cosh\left[\frac{a^{1/3} d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]-\sinh\left[\frac{a^{1/3} d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]\right)\Bigg)\Bigg/$$

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

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

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

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

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

$$\left(\cos\left[\frac{(-1)^{1/6} a^{1/3} d}{b^{1/3}}\right]\text{CosIntegral}\left[-\frac{(-1)^{1/6} a^{1/3} d}{b^{1/3}}+i d x\right]+\right.$$

$$\left.\sin\left[\frac{(-1)^{1/6} a^{1/3} d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{1/6} a^{1/3} d}{b^{1/3}}-i d x\right]\right)\Bigg)\Bigg/$$

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

$$\left(\cos\left[\frac{(-1)^{5/6} a^{1/3} d}{b^{1/3}}\right]\text{CosIntegral}\left[-\frac{(-1)^{5/6} a^{1/3} d}{b^{1/3}}+i d x\right]+\right.$$

$$\left.\sin\left[\frac{(-1)^{5/6} a^{1/3} d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{(-1)^{5/6} a^{1/3} d}{b^{1/3}}-i d x\right]\right)\Bigg)\Bigg/\left(\left(1+(-1)^{1/3}\right)^2 a^2 b^{1/3}\right)+$$

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

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

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

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

$$d \Bigg(\text{Cosh}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{CoshIntegral}\left[-\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}} + d x\right] -$$

$$\text{Sinh}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}} - d x\right]\Bigg)\Bigg)\Bigg) \Big/$$

$$\left(3 \left(-1 + (-1)^{1/3}\right) \left(1 + (-1)^{1/3}\right)^2 a^{5/3}\right) + \Bigg(\left(22 - 21 (-1)^{1/3} + 21 (-1)^{2/3}\right) b^{1/3}$$

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

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

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

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

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

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

$$\text{Sin}\left[\frac{(-1)^{1/6} a^{1/3} d}{b^{1/3}}\right] - \text{Cos}\left[\frac{(-1)^{1/6} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{(-1)^{1/6} a^{1/3} d}{b^{1/3}} - i d x\right]\Bigg)\Bigg) \Big/$$

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

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

$$\text{SinIntegral}\left[\frac{(-1)^{5/6} a^{1/3} d}{b^{1/3}} - i d x\right]\Bigg)\Bigg) \Big/ \left(\left(1 + (-1)^{1/3}\right)^2 a^2 b^{1/3}\right)\Bigg) - \text{Sinh}[c]$$

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

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

$$\left(3\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2 a^{5/3} b^{1/3}\right)+\left(\left(21-22\left(-1\right)^{1/3}+21\left(-1\right)^{2/3}\right) b^{1/3}\right.$$
$$\left(\frac{\text{Cosh}[d x]}{b^{1/3}\left(\left(-1\right)^{1/3} a^{1/3}-b^{1/3} x\right)}+\frac{1}{b^{2/3}} d\left(\text{CoshIntegral}\left[d\left(-\frac{\left(-1\right)^{1/3} a^{1/3}}{b^{1/3}}+x\right)\right]\text{Sinh}\left[\right.\right.\right.$$
$$\left.\left.\left.\frac{\left(-1\right)^{1/3} a^{1/3} d}{b^{1/3}}\right]-\text{Cosh}\left[\frac{\left(-1\right)^{1/3} a^{1/3} d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{\left(-1\right)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]\right)\right)\Big/$$
$$\left(3\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2 a^{5/3}\right)-\left(\left(2 b^{1/3}-3\left(-1\right)^{1/3} b^{1/3}+3\left(-1\right)^{2/3} b^{1/3}\right)\right.$$
$$\left.\left(\text{Cosh}\left[\frac{a^{1/3} d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]-\text{Sinh}\left[\frac{a^{1/3} d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]\right)\right)\Big/$$
$$\left(\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2 a^2 b^{1/3}\right)+\left(\left(22 b^{1/3}-21\left(-1\right)^{1/3} b^{1/3}+21\left(-1\right)^{2/3} b^{1/3}\right)\right.$$
$$\left(-\frac{\text{Cosh}[d x]}{b^{1/3}\left(\left(-1\right)^{2/3} a^{1/3}+b^{1/3} x\right)}-\frac{1}{b^{2/3}} d\left(\text{CoshIntegral}\left[\frac{\left(-1\right)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]\text{Sinh}\left[\right.\right.\right.$$
$$\left.\left.\left.\frac{\left(-1\right)^{2/3} a^{1/3} d}{b^{1/3}}\right]-\text{Cosh}\left[\frac{\left(-1\right)^{2/3} a^{1/3} d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{\left(-1\right)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]\right)\right)\Big/$$
$$\left(3\left(1+\left(-1\right)^{1/3}\right)^2 a^{5/3}\right)-\left(\left(2 b^{1/3}-3\left(-1\right)^{1/3} b^{1/3}+3\left(-1\right)^{2/3} b^{1/3}\right)\right.$$
$$\left.\left(\text{Cos}\left[\frac{\left(-1\right)^{1/6} a^{1/3} d}{b^{1/3}}\right]\text{CosIntegral}\left[-\frac{\left(-1\right)^{1/6} a^{1/3} d}{b^{1/3}}+i d x\right]+\right.\right.$$
$$\left.\left.\text{Sin}\left[\frac{\left(-1\right)^{1/6} a^{1/3} d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{\left(-1\right)^{1/6} a^{1/3} d}{b^{1/3}}-i d x\right]\right)\right)\Big/$$
$$\left(\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2 a^2 b^{1/3}\right)-\left(\left(3 b^{1/3}-2\left(-1\right)^{1/3} b^{1/3}+3\left(-1\right)^{2/3} b^{1/3}\right)\right.$$
$$\left(\text{Cos}\left[\frac{\left(-1\right)^{5/6} a^{1/3} d}{b^{1/3}}\right]\text{CosIntegral}\left[-\frac{\left(-1\right)^{5/6} a^{1/3} d}{b^{1/3}}+i d x\right]+\text{Sin}\left[\frac{\left(-1\right)^{5/6} a^{1/3} d}{b^{1/3}}\right]\right.$$
$$\left.\left.\left.\text{SinIntegral}\left[\frac{\left(-1\right)^{5/6} a^{1/3} d}{b^{1/3}}-i d x\right]\right)\right)\Big/\left(\left(1+\left(-1\right)^{1/3}\right)^2 a^2 b^{1/3}\right)\right)+$$
$$\frac{1}{2}\left(\text{Cosh}[c]\left(\frac{\text{SinhIntegral}[d x]}{a^2}-\left(\left(2 b^{1/3}-3\left(-1\right)^{1/3} b^{1/3}+3\left(-1\right)^{2/3} b^{1/3}\right)\right.\right.\right.$$
$$\left(-\text{CoshIntegral}\left[d\left(\frac{a^{1/3}}{b^{1/3}}+x\right)\right]\text{Sinh}\left[\frac{a^{1/3} d}{b^{1/3}}\right]+\right.$$
$$\left.\left.\left.\text{Cosh}\left[\frac{a^{1/3} d}{b^{1/3}}\right]\text{SinhIntegral}\left[d\left(\frac{a^{1/3}}{b^{1/3}}+x\right)\right]\right)\right)\Big/\left(\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2 a^2 b^{1/3}\right)+$$

$$\left(\left(21-22\left(-1\right)^{1/3}+21\left(-1\right)^{2/3}\right)b^{1/3}\left(-\frac{\text{Sinh}[d\,x]}{b^{1/3}\left(-\left(-1\right)^{1/3}a^{1/3}+b^{1/3}x\right)}+\frac{1}{b^{2/3}}\right.\right.$$
$$d\left(\text{Cosh}\left[\frac{\left(-1\right)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{\left(-1\right)^{1/3}a^{1/3}d}{b^{1/3}}+d\,x\right]-\right.$$
$$\left.\left.\left.\text{Sinh}\left[\frac{\left(-1\right)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{\left(-1\right)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\right)\right)\right)\Big/$$
$$\left(3\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2a^{5/3}\right)+\left(\left(22-21\left(-1\right)^{1/3}+21\left(-1\right)^{2/3}\right)b^{1/3}\right.$$
$$\left(-\frac{\text{Sinh}[d\,x]}{b^{1/3}\left(a^{1/3}+b^{1/3}x\right)}+\frac{1}{b^{2/3}}d\left(\text{Cosh}\left[\frac{a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]-\text{Sinh}\left[\frac{a^{1/3}d}{b^{1/3}}\right]\right.\right.$$
$$\left.\left.\left.\text{SinhIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\right)\right)\right)\Big/\left(3\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2a^{5/3}\right)+$$
$$\left(\left(22\,b^{1/3}-21\left(-1\right)^{1/3}b^{1/3}+21\left(-1\right)^{2/3}b^{1/3}\right)\left(-\frac{\text{Sinh}[d\,x]}{b^{1/3}\left(\left(-1\right)^{2/3}a^{1/3}+b^{1/3}x\right)}+\frac{1}{b^{2/3}}\right.\right.$$
$$d\left(\text{Cosh}\left[\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]-\text{Sinh}\left[\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}\right]\right.$$
$$\left.\left.\left.\text{SinhIntegral}\left[\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}+d\,x\right]\right)\right)\right)\Big/\left(3\left(1+\left(-1\right)^{1/3}\right)^2a^{5/3}\right)+$$
$$\left(i\left(2\,b^{1/3}-3\left(-1\right)^{1/3}b^{1/3}+3\left(-1\right)^{2/3}b^{1/3}\right)\left(\text{CosIntegral}\left[-\frac{\left(-1\right)^{1/6}a^{1/3}d}{b^{1/3}}+i\,d\,x\right]\right.\right.$$
$$\left.\left.\text{Sin}\left[\frac{\left(-1\right)^{1/6}a^{1/3}d}{b^{1/3}}\right]-\text{Cos}\left[\frac{\left(-1\right)^{1/6}a^{1/3}d}{b^{1/3}}\right]\text{SinIntegral}\left[\frac{\left(-1\right)^{1/6}a^{1/3}d}{b^{1/3}}-i\,d\,x\right]\right)\right)\Big/$$
$$\left(\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2a^2b^{1/3}\right)+\left(i\left(3\,b^{1/3}-2\left(-1\right)^{1/3}b^{1/3}+3\left(-1\right)^{2/3}b^{1/3}\right)\right.$$
$$\left(\text{CosIntegral}\left[-\frac{\left(-1\right)^{5/6}a^{1/3}d}{b^{1/3}}+i\,d\,x\right]\text{Sin}\left[\frac{\left(-1\right)^{5/6}a^{1/3}d}{b^{1/3}}\right]-\text{Cos}\left[\frac{\left(-1\right)^{5/6}a^{1/3}d}{b^{1/3}}\right]\right.$$
$$\left.\left.\left.\text{SinIntegral}\left[\frac{\left(-1\right)^{5/6}a^{1/3}d}{b^{1/3}}-i\,d\,x\right]\right)\right)\Big/\left(\left(1+\left(-1\right)^{1/3}\right)^2a^2b^{1/3}\right)+\text{Sinh}[c]$$
$$\left(\frac{\text{CoshIntegral}[d\,x]}{a^2}+\left(\left(22-21\left(-1\right)^{1/3}+21\left(-1\right)^{2/3}\right)\left(-\frac{b^{1/3}\,\text{Cosh}[d\,x]}{a^{1/3}+b^{1/3}x}-d\,\text{CoshIntegral}\left[\right.\right.\right.\right.$$
$$\left.\left.\left.\left.d\left(\frac{a^{1/3}}{b^{1/3}}+x\right)\right]\text{Sinh}\left[\frac{a^{1/3}d}{b^{1/3}}\right]+d\,\text{Cosh}\left[\frac{a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[d\left(\frac{a^{1/3}}{b^{1/3}}+x\right)\right]\right)\right)\Big/$$
$$\left(3\left(-1+\left(-1\right)^{1/3}\right)\left(1+\left(-1\right)^{1/3}\right)^2a^{5/3}b^{1/3}\right)+\left(\left(21-22\left(-1\right)^{1/3}+21\left(-1\right)^{2/3}\right)b^{1/3}\right.$$

$$\left(\frac{\text{Cosh}[d x]}{b^{1/3}\left(\left(-1\right)^{1/3} a^{1/3} - b^{1/3} x\right)} + \frac{1}{b^{2/3}} d \left(\text{CoshIntegral}\left[d\left(-\frac{\left(-1\right)^{1/3} a^{1/3}}{b^{1/3}} + x\right)\right] \text{Sinh}\left[\frac{\left(-1\right)^{1/3} a^{1/3} d}{b^{1/3}}\right] - \text{Cosh}\left[\frac{\left(-1\right)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{\left(-1\right)^{1/3} a^{1/3} d}{b^{1/3}} - d x\right]\right)\right) \Big/$$
$$\left(3\left(-1 + \left(-1\right)^{1/3}\right)\left(1 + \left(-1\right)^{1/3}\right)^2 a^{5/3}\right) - \left(\left(2 b^{1/3} - 3\left(-1\right)^{1/3} b^{1/3} + 3\left(-1\right)^{2/3} b^{1/3}\right)\right.$$
$$\left.\left(\text{Cosh}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{CoshIntegral}\left[\frac{a^{1/3} d}{b^{1/3}} + d x\right] - \text{Sinh}\left[\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{a^{1/3} d}{b^{1/3}} + d x\right]\right)\right) \Big/$$
$$\left(\left(-1 + \left(-1\right)^{1/3}\right)\left(1 + \left(-1\right)^{1/3}\right)^2 a^2 b^{1/3}\right) + \left(\left(22 b^{1/3} - 21\left(-1\right)^{1/3} b^{1/3} + 21\left(-1\right)^{2/3} b^{1/3}\right)\right.$$
$$\left(-\frac{\text{Cosh}[d x]}{b^{1/3}\left(\left(-1\right)^{2/3} a^{1/3} + b^{1/3} x\right)} - \frac{1}{b^{2/3}} d \left(\text{CoshIntegral}\left[\frac{\left(-1\right)^{2/3} a^{1/3} d}{b^{1/3}} + d x\right] \text{Sinh}\left[\frac{\left(-1\right)^{2/3} a^{1/3} d}{b^{1/3}}\right] - \text{Cosh}\left[\frac{\left(-1\right)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{\left(-1\right)^{2/3} a^{1/3} d}{b^{1/3}} + d x\right]\right)\right) \Big/$$
$$\left(3\left(1 + \left(-1\right)^{1/3}\right)^2 a^{5/3}\right) - \left(\left(2 b^{1/3} - 3\left(-1\right)^{1/3} b^{1/3} + 3\left(-1\right)^{2/3} b^{1/3}\right)\right.$$
$$\left(\text{Cos}\left[\frac{\left(-1\right)^{1/6} a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[-\frac{\left(-1\right)^{1/6} a^{1/3} d}{b^{1/3}} + i d x\right] + \text{Sin}\left[\frac{\left(-1\right)^{1/6} a^{1/3} d}{b^{1/3}}\right] \text{SinIntegral}\left[\frac{\left(-1\right)^{1/6} a^{1/3} d}{b^{1/3}} - i d x\right]\right) \Big/$$
$$\left(\left(-1 + \left(-1\right)^{1/3}\right)\left(1 + \left(-1\right)^{1/3}\right)^2 a^2 b^{1/3}\right) - \left(\left(3 b^{1/3} - 2\left(-1\right)^{1/3} b^{1/3} + 3\left(-1\right)^{2/3} b^{1/3}\right)\right.$$
$$\left(\text{Cos}\left[\frac{\left(-1\right)^{5/6} a^{1/3} d}{b^{1/3}}\right] \text{CosIntegral}\left[-\frac{\left(-1\right)^{5/6} a^{1/3} d}{b^{1/3}} + i d x\right] + \text{Sin}\left[\frac{\left(-1\right)^{5/6} a^{1/3} d}{b^{1/3}}\right]\right.$$
$$\left.\left.\left.\text{SinIntegral}\left[\frac{\left(-1\right)^{5/6} a^{1/3} d}{b^{1/3}} - i d x\right]\right) \Big/ \left(\left(1 + \left(-1\right)^{1/3}\right)^2 a^2 b^{1/3}\right)\right)\right)$$

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

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

Optimal (type 4, 784 leaves, 36 steps):

$$-\frac{x^3 \text{Cosh}[c+d x]}{6 b \left(a+b x^3\right)^2}-\frac{\text{Cosh}[c+d x]}{6 b^2 \left(a+b x^3\right)}-\frac{(-1)^{2/3} d^2 \text{Cosh}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{CoshIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{54 a^{1/3} b^{8/3}}+$$

$$\frac{(-1)^{1/3} d^2 \text{Cosh}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{CoshIntegral}\left[-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}-d x\right]}{54 a^{1/3} b^{8/3}}-$$

$$\frac{d^2 \text{Cosh}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{CoshIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{54 a^{1/3} b^{8/3}}+\frac{2 d \text{CoshIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right] \text{Sinh}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right]}{27 a^{2/3} b^{7/3}}-$$

$$\frac{2 (-1)^{1/3} d \text{CoshIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right] \text{Sinh}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right]}{27 a^{2/3} b^{7/3}}+$$

$$\frac{2 (-1)^{2/3} d \text{CoshIntegral}\left[-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}-d x\right] \text{Sinh}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right]}{27 a^{2/3} b^{7/3}}-$$

$$\frac{d x \text{Sinh}[c+d x]}{18 b^2 \left(a+b x^3\right)}+\frac{2 (-1)^{1/3} d \text{Cosh}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{27 a^{2/3} b^{7/3}}+$$

$$\frac{(-1)^{2/3} d^2 \text{Sinh}\left[c+\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{(-1)^{1/3} a^{1/3} d}{b^{1/3}}-d x\right]}{54 a^{1/3} b^{8/3}}+$$

$$\frac{2 d \text{Cosh}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{27 a^{2/3} b^{7/3}}-\frac{d^2 \text{Sinh}\left[c-\frac{a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{a^{1/3} d}{b^{1/3}}+d x\right]}{54 a^{1/3} b^{8/3}}+$$

$$\frac{2 (-1)^{2/3} d \text{Cosh}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{27 a^{2/3} b^{7/3}}+$$

$$\frac{(-1)^{1/3} d^2 \text{Sinh}\left[c-\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}\right] \text{SinhIntegral}\left[\frac{(-1)^{2/3} a^{1/3} d}{b^{1/3}}+d x\right]}{54 a^{1/3} b^{8/3}}$$

Result (type 7, 397 leaves) :

$$\frac{1}{108\,b^3}\left(d\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(-4\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+4\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+4\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-4\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1-d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1-d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1\right)\&\right]+d\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(4\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+4\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+4\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+4\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1+d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1\right)\&\right]-\frac{6\,b\left(3\left(a+2\,b\,x^3\right)\text{Cosh}[c+d\,x]+d\,x\left(a+b\,x^3\right)\text{Sinh}[c+d\,x]\right)}{\left(a+b\,x^3\right)^2}\right)$$

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

$$\int\frac{x^4\,\text{Cosh}[c+d\,x]}{\left(a+b\,x^3\right)^3}\,\text{d}x$$

Optimal (type 4, 1105 leaves, 47 steps):

$$\frac{\text{Cosh}[c+d\,x]}{9\,a\,b^2\,x}-\frac{x^2\,\text{Cosh}[c+d\,x]}{6\,b\left(a+b\,x^3\right)^2}-\frac{\text{Cosh}[c+d\,x]}{9\,b^2\,x\left(a+b\,x^3\right)}-\frac{(-1)^{2/3}\,\text{Cosh}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{27\,a^{4/3}\,b^{5/3}}-\frac{(-1)^{1/3}\,d^2\,\text{Cosh}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{54\,a^{2/3}\,b^{7/3}}+\frac{(-1)^{1/3}\,\text{Cosh}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{27\,a^{4/3}\,b^{5/3}}+\frac{(-1)^{2/3}\,d^2\,\text{Cosh}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{54\,a^{2/3}\,b^{7/3}}-\frac{\text{Cosh}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{27\,a^{4/3}\,b^{5/3}}+\frac{d^2\,\text{Cosh}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{54\,a^{2/3}\,b^{7/3}}-\frac{d\,\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\text{Sinh}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]}{27\,a\,b^2}-\frac{d\,\text{CoshIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\text{Sinh}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]}{27\,a\,b^2}-$$

$$\frac{d\,\text{CoshIntegral}\left[-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}-d\,x\right]\text{Sinh}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]}{27\,a\,b^2}-$$

$$\frac{d\,\text{Sinh}[c+d\,x]}{18\,b^2\left(a+b\,x^3\right)}+\frac{d\,\text{Cosh}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{27\,a\,b^2}+$$

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

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

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

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

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

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

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

Result (type 7, 675 leaves) :

$$\frac{1}{108\,a\,b^3}\left(\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(a\,d^2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-a\,d^2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-a\,d^2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+a\,d^2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+2\,b\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1-2\,b\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1-2\,b\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+2\,b\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+2\,b\,d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1^2-2\,b\,d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1^2-2\,b\,d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2+2\,b\,d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2\right)\&\right]-\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(-a\,d^2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-a\,d^2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-a\,d^2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-a\,d^2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-2\,b\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1-2\,b\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1-2\,b\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1-2\,b\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+2\,b\,d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1^2+2\,b\,d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1^2+2\,b\,d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2+2\,b\,d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2\right)\&\right]+\frac{6\,b\,\text{Cosh}[d\,x]\left(b\,x^2\left(-a+2\,b\,x^3\right)\text{Cosh}[c]-a\,d\left(a+b\,x^3\right)\text{Sinh}[c]\right)}{\left(a+b\,x^3\right)^2}+\frac{6\,b\left(-a\,d\left(a+b\,x^3\right)\text{Cosh}[c]+b\,x^2\left(-a+2\,b\,x^3\right)\text{Sinh}[c]\right)\text{Sinh}[d\,x]}{\left(a+b\,x^3\right)^2}\right)$$

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

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

Optimal (type 4, 776 leaves, 71 steps):

$$\frac{\text{Cosh}[c+d\,x]}{18\,a\,b^2\,x^2}-\frac{x\,\text{Cosh}[c+d\,x]}{6\,b\,\left(a+b\,x^3\right)^2}-\frac{\text{Cosh}[c+d\,x]}{18\,b^2\,x^2\,\left(a+b\,x^3\right)}-$$
$$\frac{(-1)^{1/3}\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^{5/3}\,b^{4/3}}-$$
$$\frac{d^2\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{54\,a\,b^2}+$$
$$\frac{(-1)^{2/3}\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^{5/3}\,b^{4/3}}-$$
$$\frac{d^2\,\text{Cosh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{54\,a\,b^2}+$$
$$\frac{\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}-\frac{d^2\,\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{CoshIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a\,b^2}+$$
$$\frac{d\,\text{Sinh}[c+d\,x]}{18\,a\,b^2\,x}-\frac{d\,\text{Sinh}[c+d\,x]}{18\,b^2\,x\,\left(a+b\,x^3\right)}+\frac{(-1)^{1/3}\,\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^{5/3}\,b^{4/3}}+$$
$$\frac{d^2\,\text{Sinh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{54\,a\,b^2}+$$
$$\frac{\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}-\frac{d^2\,\text{Sinh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a\,b^2}+$$
$$\frac{(-1)^{2/3}\,\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^{5/3}\,b^{4/3}}-$$
$$\frac{d^2\,\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\,\text{SinhIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a\,b^2}$$

Result (type 7, 429 leaves) :

$$-\frac{1}{108\,a\,b^2}\left(\text{RootSum}\left[a+b\,\#1^3\&,\right.\right.$$
$$\frac{1}{\#1^2}\left(-2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+\right.$$
$$2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+$$
$$d^2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1^2-$$
$$d^2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1^2-d^2\,\text{Cosh}[c+d\,\#1]$$
$$\left.\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2+d^2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2\right)\&\Big]+$$
$$\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(-2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-\right.\right.$$
$$2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-$$
$$2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+d^2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]$$
$$\#1^2+d^2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1^2+d^2\,\text{Cosh}[c+d\,\#1]$$
$$\left.\left.\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2+d^2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2\right)\&\Big]-$$
$$\left.\frac{6\,b\,x\left(\left(-2\,a+b\,x^3\right)\text{Cosh}[c+d\,x]+d\,x\left(a+b\,x^3\right)\text{Sinh}[c+d\,x]\right)}{\left(a+b\,x^3\right)^2}\right)$$

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

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

Optimal (type 4, 781 leaves, 37 steps):

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

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

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

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

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

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

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

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

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

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

Result (type 7, 423 leaves) :

$$-\frac{1}{108\,a\,b^2}\left(d\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1-d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1-d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1\right)\&\right]+d\,\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(-2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]-2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]-2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1+d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1\right)\&\right]-\frac{6\,b\,\text{Cosh}[d\,x]\left(-3\,a\,\text{Cosh}[c]+d\,x\left(a+b\,x^3\right)\text{Sinh}[c]\right)}{\left(a+b\,x^3\right)^2}-\frac{6\,b\left(d\,x\left(a+b\,x^3\right)\text{Cosh}[c]-3\,a\,\text{Sinh}[c]\right)\text{Sinh}[d\,x]}{\left(a+b\,x^3\right)^2}\right)$$

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

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

Optimal (type 4, 1147 leaves, 89 steps):

$$-\frac{\text{Cosh}[c+d\,x]}{18\,a\,b^2\,x^4}+\frac{2\,\text{Cosh}[c+d\,x]}{9\,a^2\,b\,x}-\frac{\text{Cosh}[c+d\,x]}{6\,b\,x\left(a+b\,x^3\right)^2}+\frac{\text{Cosh}[c+d\,x]}{18\,b^2\,x^4\left(a+b\,x^3\right)}-\frac{2\left(-1\right)^{2/3}\text{Cosh}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{27\,a^{7/3}\,b^{2/3}}+\frac{\left(-1\right)^{1/3}d^2\,\text{Cosh}\left[c+\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{(-1)^{1/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{54\,a^{5/3}\,b^{4/3}}+\frac{2\left(-1\right)^{1/3}\text{Cosh}\left[c-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{(-1)^{2/3}a^{1/3}d}{b^{1/3}}-d\,x\right]}{27\,a^{7/3}\,b^{2/3}}-\frac{1}{54\,a^{5/3}\,b^{4/3}}\left(-1\right)^{2/3}d^2\,\text{Cosh}\left[c-\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[-\frac{\left(-1\right)^{2/3}a^{1/3}d}{b^{1/3}}-d\,x\right]-\frac{2\,\text{Cosh}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{27\,a^{7/3}\,b^{2/3}}-\frac{d^2\,\text{Cosh}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]}{54\,a^{5/3}\,b^{4/3}}-\frac{2\,d\,\text{CoshIntegral}\left[\frac{a^{1/3}d}{b^{1/3}}+d\,x\right]\text{Sinh}\left[c-\frac{a^{1/3}d}{b^{1/3}}\right]}{27\,a^2\,b}-$$

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

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

$$\frac{d\,\text{Sinh}[c+d\,x]}{18\,b^2\,x^3\,\left(a+b\,x^3\right)}+\frac{2\,d\,\text{Cosh}\left[c+\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{1/3}\,a^{1/3}\,d}{b^{1/3}}-d\,x\right]}{27\,a^2\,b}+$$

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

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

$$\frac{2\,d\,\text{Cosh}\left[c-\frac{a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{27\,a^2\,b}-$$

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

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

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

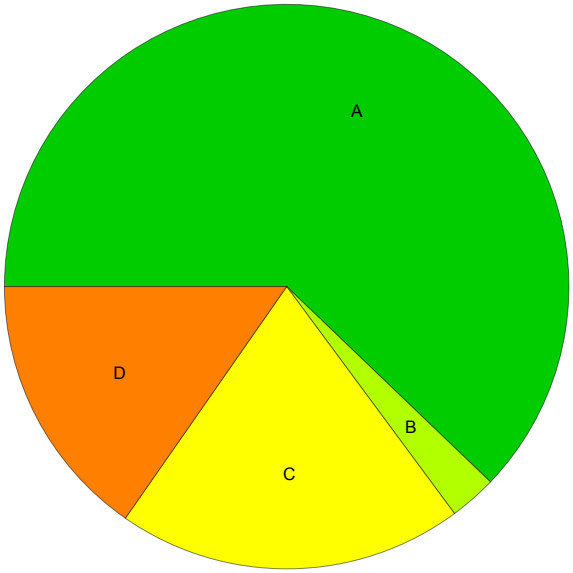
$$\frac{(-1)^{2/3}\,d^2\,\text{Sinh}\left[c-\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}\right]\text{SinhIntegral}\left[\frac{(-1)^{2/3}\,a^{1/3}\,d}{b^{1/3}}+d\,x\right]}{54\,a^{5/3}\,b^{4/3}}$$

Result (type 7, 669 leaves) :

$$\frac{1}{108\,a^2\,b^2}\left(\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(-a\,d^2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+a\,d^2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+a\,d^2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-a\,d^2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+4\,b\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1-4\,b\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1-4\,b\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+4\,b\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+4\,b\,d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1^2-4\,b\,d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1^2-4\,b\,d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2+4\,b\,d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2\right)\&\right]-\text{RootSum}\left[a+b\,\#1^3\&,\ \frac{1}{\#1^2}\left(a\,d^2\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]+a\,d^2\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]+a\,d^2\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]+a\,d^2\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]-4\,b\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1-4\,b\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1-4\,b\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1-4\,b\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1+4\,b\,d\,\text{Cosh}[c+d\,\#1]\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\#1^2+4\,b\,d\,\text{CoshIntegral}\left[d\left(x-\#1\right)\right]\text{Sinh}[c+d\,\#1]\,\#1^2+4\,b\,d\,\text{Cosh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2+4\,b\,d\,\text{Sinh}[c+d\,\#1]\,\text{SinhIntegral}\left[d\left(x-\#1\right)\right]\#1^2\right)\&\right]+\frac{1}{\left(a+b\,x^3\right)^2}6\,b\,\text{Cosh}[d\,x]\left(b\,x^2\left(7\,a+4\,b\,x^3\right)\text{Cosh}[c]+a\,d\left(a+b\,x^3\right)\text{Sinh}[c]\right)+\frac{1}{\left(a+b\,x^3\right)^2}6\,b\left(a\,d\left(a+b\,x^3\right)\text{Cosh}[c]+b\,x^2\left(7\,a+4\,b\,x^3\right)\text{Sinh}[c]\right)\text{Sinh}[d\,x]\right)$$

Summary of Integration Test Results

111 integration problems



A - 69 optimal antiderivatives

B - 3 more than twice size of optimal antiderivatives

C - 22 unnecessarily complex antiderivatives

D - 17 unable to integrate problems

E - 0 integration timeouts