Mathematica 11.3 Integration Test Results

Test results for the 294 problems in "4.7.2 trig^m (a trig+b trig)^n.m"

Problem 6: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Csc}[x]^2\,(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x])\,dx$$

Optimal (type 3, 12 leaves, 5 steps):

$$-b\,\mathrm{ArcTanh}[\mathrm{Cos}[x]]-a\,\mathrm{Csc}[x]$$

Result (type 3, 25 leaves):

$$-a\,\mathrm{Csc}[x]-b\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{x}{2}\right]\right]+b\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{x}{2}\right]\right]$$

Problem 8: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 91 leaves, 5 steps):

$$\frac{a^2\,b\,x}{\left(a^2+b^2\right)^2}+\frac{b\,x}{2\,\left(a^2+b^2\right)}-\frac{a^3\,\mathrm{Log}[a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]]}{\left(a^2+b^2\right)^2}-\frac{b\,\mathrm{Cos}[x]\,\mathrm{Sin}[x]}{2\,\left(a^2+b^2\right)}-\frac{a\,\mathrm{Sin}[x]^2}{2\,\left(a^2+b^2\right)}$$

Result (type 3, 94 leaves):

$$\frac{1}{4\,\left(a^2+b^2\right)^2}\Big(-4\,i\,a^3\,x+6\,a^2\,b\,x+2\,b^3\,x+4\,i\,a^3\,\mathrm{ArcTan}[\mathrm{Tan}[x]]+ a\,\left(a^2+b^2\right)\,\mathrm{Cos}[2\,x]-2\,a^3\,\mathrm{Log}\left[\left(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]\right)^2\right]-a^2\,b\,\mathrm{Sin}[2\,x]-b^3\,\mathrm{Sin}[2\,x]\Big)$$

Problem 10: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\mathrm{Sin}[x]}{a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]}\,dx$$

Optimal (type 3, 35 leaves, 2 steps):

$$\frac{b\,x}{a^2+b^2}-\frac{a\,\mathrm{Log}[a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]]}{a^2+b^2}$$

Result (type 3, 47 leaves):

$$\frac{1}{2\,\left(a^2+b^2\right)}\left(2\,\left(-i\,a+b\right)\,x+2\,i\,a\,\mathrm{ArcTan}[\mathrm{Tan}[x]]-a\,\mathrm{Log}\left[\left(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]\right)^2\right]\right)$$

Problem 16: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 64 leaves, 4 steps):

$$-\frac{(a^2-b^2)\,x}{(a^2+b^2)^2}+\frac{a}{(a^2+b^2)\,(b+a\,\text{Cot}[x])}-\frac{2\,a\,b\,\text{Log}[a\,\text{Cos}[x]+b\,\text{Sin}[x]]}{(a^2+b^2)^2}$$

Result (type 3, 121 leaves):

$$\Big(-a\,\text{Cos}[x]\,\big((a+i\,b)^2\,x+a\,b\,\text{Log}[(a\,\text{Cos}[x]+b\,\text{Sin}[x])^2]\big)+\big(a^3+a\,b^2\,(1-2\,i\,x)-a^2\,b\,x+b^3\,x-a\,b^2\,\text{Log}[(a\,\text{Cos}[x]+b\,\text{Sin}[x])^2]\big)\,\text{Sin}[x]+2\,i\,a\,b\,\text{ArcTan}[\text{Tan}[x]]\,(a\,\text{Cos}[x]+b\,\text{Sin}[x])\Big)\Big/\Big((a^2+b^2)^2\,(a\,\text{Cos}[x]+b\,\text{Sin}[x])\Big)$$

Problem 21: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 118 leaves, 11 steps):

$$-\frac{\text{ArcTanh}[\text{Cos}[x]]}{2\,a^2}-\frac{2\,b^2\,\text{ArcTanh}[\text{Cos}[x]]}{a^4}-\frac{(a^2+b^2)\,\text{ArcTanh}[\text{Cos}[x]]}{a^4}+\frac{3\,b\,\sqrt{a^2+b^2}\,\text{ArcTanh}\Big[\frac{b\,\text{Cos}[x]-a\,\text{Sin}[x]}{\sqrt{a^2+b^2}}\Big]}{a^4}+\frac{2\,b\,\text{Csc}[x]}{a^3}-\frac{\text{Cot}[x]\,\text{Csc}[x]}{2\,a^2}+\frac{a^2+b^2}{a^3\,(a\,\text{Cos}[x]+b\,\text{Sin}[x])}$$

Result (type 3, 270 leaves):

$$\frac{1}{8\,a^4\,(b+a\,\text{Cot}[x])}\Bigg(-48\,b\,\sqrt{a^2+b^2}\,\text{ArcTanh}\Big[\frac{-b+a\,\text{Tan}[\frac{x}{2}]}{\sqrt{a^2+b^2}}\Big]\,(b+a\,\text{Cot}[x])+8\,a^3\,\text{Csc}[x]+8\,a\,b^2\,\text{Csc}[x]-12\,a^2\,b\,\text{Log}\big[\text{Cos}[\tfrac{x}{2}]\big]-24\,b^3\,\text{Log}\big[\text{Cos}[\tfrac{x}{2}]\big]-12\,a^3\,\text{Cot}[x]\,\text{Log}\big[\text{Cos}[\tfrac{x}{2}]\big]-24\,a\,b^2\,\text{Cot}[x]\,\text{Log}\big[\text{Cos}[\tfrac{x}{2}]\big]+12\,a^2\,b\,\text{Log}\big[\text{Sin}[\tfrac{x}{2}]\big]+24\,b^3\,\text{Log}\big[\text{Sin}[\tfrac{x}{2}]\big]+12\,a^3\,\text{Cot}[x]\,\text{Log}\big[\text{Sin}[\tfrac{x}{2}]\big]+24\,a\,b^2\,\text{Cot}[x]\,\text{Log}\big[\text{Sin}[\tfrac{x}{2}]\big]+a^2\,b\,\text{Sec}[\tfrac{x}{2}]^2+a^3\,\text{Cot}[x]\,\text{Sec}[\tfrac{x}{2}]^2-a\,\text{Csc}[\tfrac{x}{2}]^2\,\big(-4\,a\,b\,\text{Cos}[x]+a^2\,\text{Cot}[x]+b\,(a-4\,b\,\text{Sin}[x])\big)+8\,a\,b^2\,\text{Tan}[\tfrac{x}{2}]+8\,a^2\,b\,\text{Cot}[x]\,\text{Tan}[\tfrac{x}{2}]\Bigg)$$

Problem 22: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\mathrm{Sin}[x]^3}{(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x])^3}\,dx$$

Optimal (type 3, 98 leaves, 5 steps):

$$-\frac{b\,(3\,a^2-b^2)\,x}{(a^2+b^2)^3}+\frac{a}{2\,(a^2+b^2)\,(b+a\,\mathrm{Cot}[x])^2}+\frac{2\,a\,b}{(a^2+b^2)^2\,(b+a\,\mathrm{Cot}[x])}+\frac{a\,(a^2-3\,b^2)\,\mathrm{Log}[a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]]}{(a^2+b^2)^3}$$

Result (type 3, 114 leaves):

$$\frac{b\,(-3\,a^2+b^2)\,x}{(a^2+b^2)^3}+\frac{a\,(a^2-3\,b^2)\,\mathrm{Log}[a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]]}{(a^2+b^2)^3}+\frac{a^3}{2\,(a-i\,b)^2\,(a+i\,b)^2\,(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x])^2}+\frac{3\,a\,b\,\mathrm{Sin}[x]}{(a^2+b^2)^2\,(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x])}$$

Problem 24: Result more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{Sin}[x]}{(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x])^3}\,dx$$

Optimal (type 3, 15 leaves, 2 steps):

$$\frac{1}{2\,a\,(b+a\,\mathrm{Cot}[x])^2}$$

Result (type 3, 47 leaves):

$$\frac{2\,b^2\,\mathrm{Sin}[x]^2+a\,(a+b\,\mathrm{Sin}[2\,x])}{2\,a\,(a^2+b^2)\,(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x])^2}$$

Problem 25: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x])^3}\,dx$$

Optimal (type 3, 73 leaves, 3 steps):

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

Result (type 3, 101 leaves):

$$\left(\left(a^2+b^2\right)\left(-b\,\mathrm{Cos}[x]+a\,\mathrm{Sin}[x]\right)+2\sqrt{a^2+b^2}\,\mathrm{ArcTanh}\left[\frac{-b+a\,\mathrm{Tan}\left[\frac{x}{2}\right]}{\sqrt{a^2+b^2}}\right]\left(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]\right)^2\right)\Big/$$
$$\left(2\left(a-\mathrm{i}\,b\right)^2\left(a+\mathrm{i}\,b\right)^2\left(a\,\mathrm{Cos}[x]+b\,\mathrm{Sin}[x]\right)^2\right)$$

Problem 29: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \mathrm{Sin}[c+d\,x]^{-n}\left(a\,\mathrm{Cos}[c+d\,x]+\mathrm{i}\,a\,\mathrm{Sin}[c+d\,x]\right)^n\,dx$$

Optimal (type 5, 66 leaves, 1 step):

$$-\frac{1}{2\,d\,n}\mathrm{i}\,\mathrm{Hypergeometric2F1}\left[1,\,n,\,1+n,\,-\frac{1}{2}\,\mathrm{i}\left(\mathrm{i}+\mathrm{Cot}[c+d\,x]\right)\right]$$
$$\mathrm{Sin}[c+d\,x]^{-n}\left(a\,\mathrm{Cos}[c+d\,x]+\mathrm{i}\,a\,\mathrm{Sin}[c+d\,x]\right)^n$$

Result (type 6, 2971 leaves):

$$\Bigg(e^{-\mathrm{i}\,n\,(c+d\,x)+n\,\mathrm{Log}[\mathrm{Cos}[c+d\,x]+\mathrm{i}\,\mathrm{Sin}[c+d\,x]]}\left(\mathrm{Cos}[c+d\,x]+\mathrm{i}\,\mathrm{Sin}[c+d\,x]\right)^{\frac{\mathrm{i}\,n\,(c+d\,x)}{\mathrm{Log}[\mathrm{Cos}[c+d\,x]+\mathrm{i}\,\mathrm{Sin}[c+d\,x]]}}$$
$$\left(a\left(\mathrm{Cos}[c+d\,x]+\mathrm{i}\,\mathrm{Sin}[c+d\,x]\right)\right)^n\mathrm{Sin}[c+d\,x]^{-2\,n}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]$$
$$\Bigg(-\mathrm{Hypergeometric2F1}\left[1-2\,n,\,1-n,\,2-n,\,-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\left(1+\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^{-2\,n}+$$
$$\left(\left(-2+n\right)\mathrm{AppellF1}\left[1-n,\,-2\,n,\,1,\,2-n,\,-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right],\,\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\right)\Big/$$
$$\Bigg(\left(\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\Bigg(\mathrm{i}\left(-2+n\right)\mathrm{AppellF1}\left[1-n,\,-2\,n,\,1,\,2-n,\,-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right],\right.$$
$$\left.\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]+\Bigg(2\,n\,\mathrm{AppellF1}\Big[2-n,\,1-2\,n,\,1,\,3-n,\,-\mathrm{i}$$
$$\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right],\,\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\Big]+\mathrm{AppellF1}\Big[2-n,\,-2\,n,\,2,\,3-n,$$
$$-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right],\,\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\Big]\Bigg)\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$
$$\Bigg(d\left(-1+n\right)\Bigg(\frac{1}{2\left(-1+n\right)}\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\left(\mathrm{Cos}[c+d\,x]+\mathrm{i}\,\mathrm{Sin}[c+d\,x]\right)^n\mathrm{Sin}[c+d\,x]^{-n}$$
$$\Bigg(-\mathrm{Hypergeometric2F1}\left[1-2\,n,\,1-n,\,2-n,\,-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]$$
$$\left(1+\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)^{-2\,n}+$$
$$\left(\left(-2+n\right)\mathrm{AppellF1}\left[1-n,\,-2\,n,\,1,\,2-n,\,-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right],\,\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]\right)\Big/$$
$$\Bigg(\left(\mathrm{i}+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)\Bigg(\mathrm{i}\left(-2+n\right)\mathrm{AppellF1}\Big[1-n,\,-2\,n,\,1,\,2-n,$$
$$-\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right],\,\mathrm{i}\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\Big]+\Bigg(2\,n\,\mathrm{AppellF1}\Big[2-n,\,1-2\,n,\,1,$$

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

$$3-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right],\,i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big)\Big) -$$

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

$$\Big(-\text{Hypergeometric2F1}\left[1-2n,\,1-n,\,2-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]$$

$$\left(1+i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^{-2n} +$$

$$\Big((-2+n)\,\text{AppellF1}\left[1-n,\,-2n,\,1,\,2-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right],\,i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]\Big)\Big/$$

$$\Big(\left(i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\,\Big(i\,(-2+n)\,\text{AppellF1}[1-n,\,-2n,\,1,\,2-n,$$

$$-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right],\,i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]] + \Big(2n\,\text{AppellF1}[2-n,\,1-2n,\,1,$$

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

$$3-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right],\,i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big) +$$

$$\frac{1}{-1+n}\,n\,(i\,\text{Cos}[c+d x]-\text{Sin}[c+d x])\,(\text{Cos}[c+d x]+i\,\text{Sin}[c+d x])^{-1+n}$$

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

$$\Big(-\text{Hypergeometric2F1}\left[1-2n,\,1-n,\,2-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]$$

$$\left(1+i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^{-2n} +$$

$$\Big((-2+n)\,\text{AppellF1}\left[1-n,\,-2n,\,1,\,2-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right],\,i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]\Big)\Big/$$

$$\Big(\left(i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\,\Big(i\,(-2+n)\,\text{AppellF1}[1-n,\,-2n,\,1,\,2-n,$$

$$-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right],\,i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]] + \Big(2n\,\text{AppellF1}[2-n,\,1-2n,\,1,$$

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

$$3-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right],\,i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]]\Big)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\Big)\Big)\Big) +$$

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

$$\Big(i\,n\,\text{Hypergeometric2F1}\left[1-2n,\,1-n,\,2-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^{2}$$

$$\left(1+i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^{-1-2n} - \frac{1}{2}(1-n)\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]$$

$$\Big(-\text{Hypergeometric2F1}\left[1-2n,\,1-n,\,2-n,\,-i\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right] +$$

$$\left(1+\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^{-1+2\,n}\Big)\,\left(1+\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^{-2\,n}-$$

$$\Big(\Big((-2+n)\,\text{AppellF1}\left[1-n,\,-2\,n,\,1,\,2-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right]$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big)\Big/\Big(2\,\left(\mathrm{i}+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\,\Big(\mathrm{i}\,(-2+n)\,\text{AppellF1}\Big[1-n,\,-2\,n,\,1,$$

$$2-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]+\Big(2\,n\,\text{AppellF1}\Big[2-n,\,1-2\,n,\,1,$$

$$3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]+\text{AppellF1}\Big[2-n,\,-2\,n,\,2,$$

$$3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]\Big)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big)\Big)+$$

$$\Big((-2+n)\,\Big(\frac{1}{2-n}\mathrm{i}\,(1-n)\,n\,\text{AppellF1}\Big[2-n,\,1-2\,n,\,1,\,3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],$$

$$\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\frac{1}{2\,(2-n)}\mathrm{i}\,(1-n)\,\text{AppellF1}\Big[2-n,$$

$$-2\,n,\,2,\,3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big)\Big)\Big/$$

$$\Big(\left(\mathrm{i}+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\Big(\mathrm{i}\,(-2+n)\,\text{AppellF1}\Big[1-n,\,-2\,n,\,1,\,2-n,$$

$$-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]+\Big(2\,n\,\text{AppellF1}\Big[2-n,\,1-2\,n,\,1,$$

$$3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]+\text{AppellF1}\Big[2-n,\,-2\,n,\,2,$$

$$3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]\Big)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big)\Big)-$$

$$\Big((-2+n)\,\text{AppellF1}\left[1-n,\,-2\,n,\,1,\,2-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right]$$

$$\Big(\frac{1}{2}\,\Big(2\,n\,\text{AppellF1}\Big[2-n,\,1-2\,n,\,1,\,3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]+$$

$$\text{AppellF1}\Big[2-n,\,-2\,n,\,2,\,3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]\Big)$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\mathrm{i}\,(-2+n)\,\Big(\frac{1}{2-n}\mathrm{i}\,(1-n)\,n\,\text{AppellF1}\Big[2-n,\,1-2\,n,\,1,\,3-n,$$

$$-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\frac{1}{2\,(2-n)}\mathrm{i}\,(1-$$

$$n)\,\text{AppellF1}\Big[2-n,\,-2\,n,\,2,\,3-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]$$

$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\Big)+\Big(\frac{1}{3-n}\mathrm{i}\,(2-n)\,n\,\text{AppellF1}\Big[3-n,\,1-2\,n,\,2,\,4-n,$$

$$-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2+\frac{1}{3-n}\mathrm{i}\,(2-n)$$

$$\text{AppellF1}\Big[3-n,\,-2\,n,\,3,\,4-n,\,-\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right],\,\mathrm{i}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Big]$$

$$\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2+2 n \left(\frac{1}{2(3-n)} i (2-n) \text{AppellF1}\left[3-n, 1-2 n, 2, 4-n, -i \text{Tan}\left[\frac{1}{2}(c+d x)\right], i \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2-\frac{1}{2(3-n)} i (1-2 n)(2-n) \text{AppellF1}\left[3-n, 2-2 n, 1, 4-n, -i \text{Tan}\left[\frac{1}{2}(c+d x)\right], i \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Bigg) \Bigg/ \left(\left(i+\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\left(i(-2+n) \text{AppellF1}\left[1-n, -2 n, 1, 2-n, -i \text{Tan}\left[\frac{1}{2}(c+d x)\right], i \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]+\left(2 n \text{AppellF1}\left[2-n, 1-2 n, 1, 3-n, -i \text{Tan}\left[\frac{1}{2}(c+d x)\right], i \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]+\text{AppellF1}\left[2-n, -2 n, 2, 3-n, -i \text{Tan}\left[\frac{1}{2}(c+d x)\right], i \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right]\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)^2\right)\right)\right)$$

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

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

Optimal (type 3, 24 leaves, 5 steps):

$$\frac{a \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{b \text{Sec}[c+d x]}{d}$$

Result (type 3, 81 leaves):

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

Problem 41: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^6 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x]) \, dx$$

Optimal (type 3, 74 leaves, 7 steps):

$$\frac{3 a \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{b \text{Sec}[c+d x]^5}{5 d}+\frac{3 a \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{a \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 d}$$

Result (type 3, 207 leaves):

$$-\frac{3\,a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{3\,a\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]}{8\,d}+\frac{b\,\text{Sec}[c+d\,x]^5}{5\,d}+\frac{a}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}+\frac{3\,a}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-\frac{a}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4}-\frac{3\,a}{16\,d\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}$$

Problem 51: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 67 leaves, 7 steps):

$$\frac{a^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}-\frac{b^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{2\,a\,b\,\text{Sec}[c+d\,x]}{d}+\frac{b^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 181 leaves):

$$\frac{1}{4\,d}\left(8\,a\,b+\left(-4\,a^2+2\,b^2\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+4\,a^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-2\,b^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{b^2}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+16\,a\,b\,\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^2-\frac{b^2}{\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}\right)$$

Problem 53: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^5\,(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^2\,dx$$

Optimal (type 3, 120 leaves, 9 steps):

$$\frac{a^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-\frac{b^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{2\,a\,b\,\text{Sec}[c+d\,x]^3}{3\,d}+\frac{a^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}-\frac{b^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{b^2\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 851 leaves):

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

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

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

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

$$\left(8\, d\, (a\, \text{Cos}[c+d\, x]+b\, \text{Sin}[c+d\, x])^2\right)+\left(b^2\, \text{Cos}[c+d\, x]^2\, (a+b\, \text{Tan}[c+d\, x])^2\right) \Big/$$

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

$$\left(\left(12\, a^2+8\, a\, b-3\, b^2\right) \text{Cos}[c+d\, x]^2\, (a+b\, \text{Tan}[c+d\, x])^2\right) \Big/$$

$$\left(48\, d \left(\text{Cos}\left[\frac{1}{2} (c+d\, x)\right]-\text{Sin}\left[\frac{1}{2} (c+d\, x)\right]\right)^2 (a\, \text{Cos}[c+d\, x]+b\, \text{Sin}[c+d\, x])^2\right)+$$

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

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

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

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

$$\left(b^2\, \text{Cos}[c+d\, x]^2\, (a+b\, \text{Tan}[c+d\, x])^2\right) \Big/$$

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

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

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

$$\left(\left(-12\, a^2+8\, a\, b+3\, b^2\right) \text{Cos}[c+d\, x]^2\, (a+b\, \text{Tan}[c+d\, x])^2\right) \Big/$$

$$\left(48\, d \left(\text{Cos}\left[\frac{1}{2} (c+d\, x)\right]+\text{Sin}\left[\frac{1}{2} (c+d\, x)\right]\right)^2 (a\, \text{Cos}[c+d\, x]+b\, \text{Sin}[c+d\, x])^2\right)-$$

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

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

Problem 55: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\, x]^7\, (a\, \text{Cos}[c+d\, x]+b\, \text{Sin}[c+d\, x])^2\, dx$$

Optimal (type 3, 168 leaves, 11 steps):

$$\frac{3\,a^2\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{8\,d}-\frac{b^2\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{16\,d}+\frac{2\,a\,b\,\mathrm{Sec}[c+d\,x]^5}{5\,d}+\frac{3\,a^2\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{8\,d}-\frac{b^2\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{16\,d}+\frac{a^2\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{4\,d}-\frac{b^2\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{24\,d}+\frac{b^2\,\mathrm{Sec}[c+d\,x]^5\,\mathrm{Tan}[c+d\,x]}{6\,d}$$

Result (type 3, 1175 leaves):

$$\frac{3\,a\,b\,\mathrm{Cos}[c+d\,x]^2\,(a+b\,\mathrm{Tan}[c+d\,x])^2}{20\,d\,(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2}+$$

$$\left(\left(-6\,a^2+b^2\right)\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right](a+b\,\mathrm{Tan}[c+d\,x])^2\right)\Big/\left(16\,d\,(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)+$$

$$\left(\left(6\,a^2-b^2\right)\mathrm{Cos}[c+d\,x]^2\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right](a+b\,\mathrm{Tan}[c+d\,x])^2\right)\Big/\left(16\,d\,(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)+\left(b^2\,\mathrm{Cos}[c+d\,x]^2\,(a+b\,\mathrm{Tan}[c+d\,x])^2\right)\Big/$$

$$\left(48\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^6(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)+$$

$$\left(\left(5\,a^2+4\,a\,b\right)\mathrm{Cos}[c+d\,x]^2\,(a+b\,\mathrm{Tan}[c+d\,x])^2\right)\Big/$$

$$\left(80\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)+$$

$$\left(\left(30\,a^2+12\,a\,b-5\,b^2\right)\mathrm{Cos}[c+d\,x]^2\,(a+b\,\mathrm{Tan}[c+d\,x])^2\right)\Big/$$

$$\left(160\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)+$$

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

$$\left(10\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^5(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)+$$

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

$$\left(20\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)+$$

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

$$\left(20\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)-$$

$$\left(b^2\,\mathrm{Cos}[c+d\,x]^2\,(a+b\,\mathrm{Tan}[c+d\,x])^2\right)\Big/$$

$$\left(48\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^6(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right)-$$

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

$$\left(10\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^5\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^2\right)+$$

$$\left(\left(-5\,a^2+4\,a\,b\right)\text{Cos}[c+d\,x]^2\left(a+b\,\text{Tan}[c+d\,x]\right)^2\right)\Big/$$

$$\left(80\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^2\right)-$$

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

$$\left(20\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^2\right)+$$

$$\left(\left(-30\,a^2+12\,a\,b+5\,b^2\right)\text{Cos}[c+d\,x]^2\left(a+b\,\text{Tan}[c+d\,x]\right)^2\right)\Big/$$

$$\left(160\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^2\right)-$$

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

$$\left(20\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^2\right)$$

Problem 66: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^4\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\,dx$$

Optimal (type 3, 103 leaves, 9 steps):

$$\frac{a^3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{d}-\frac{3\,a\,b^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{3\,a^2\,b\,\text{Sec}[c+d\,x]}{d}-$$
$$\frac{b^3\,\text{Sec}[c+d\,x]}{d}+\frac{b^3\,\text{Sec}[c+d\,x]^3}{3\,d}+\frac{3\,a\,b^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 293 leaves):

$$\frac{1}{12\,d}\left(36\,a^2\,b-10\,b^3-6\,a\left(2\,a^2-3\,b^2\right)\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+12\,a^3\right.$$
$$\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-18\,a\,b^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$\frac{9\,a\,b^2}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{b^3}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$2\,b\left(18\,a^2-b^2+2\,b^2\,\text{Cos}[c+d\,x]+\left(18\,a^2-5\,b^2\right)\text{Cos}[2\,(c+d\,x)]\right)\text{Sec}[c+d\,x]^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^2-$$
$$\left.\frac{9\,a\,b^2}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+\frac{b^3}{\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}\right)$$

Problem 67: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 30 leaves, 2 steps):

$$\frac{\left(b+a \text{Cot}[c+d x]\right)^4 \text{Tan}[c+d x]^4}{4 b d}$$

Result (type 3, 79 leaves):

$$\frac{1}{8 d}\text{Sec}[c+d x]^4 \left(\left(6 a^2 b-2 b^3\right) \text{Cos}\left[2 (c+d x)\right]+a \left(6 a b+2 \left(a^2+b^2\right) \text{Sin}\left[2 (c+d x)\right]+\left(a^2-b^2\right) \text{Sin}\left[4 (c+d x)\right]\right)\right)$$

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

$$\int \text{Sec}[c+d x]^6 \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^3 \, dx$$

Optimal (type 3, 158 leaves, 12 steps):

$$\frac{a^3 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{3 a b^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{a^2 b \text{Sec}[c+d x]^3}{d}-\frac{b^3 \text{Sec}[c+d x]^3}{3 d}+\frac{b^3 \text{Sec}[c+d x]^5}{5 d}+\frac{a^3 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}-\frac{3 a b^2 \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{3 a b^2 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 d}$$

Result (type 3, 464 leaves):

$$\frac{1}{1920\,d}\,\text{Sec}[c+d\,x]^5\,\Big(960\,a^2\,b+64\,b^3+320\,\left(3\,a^2\,b-b^3\right)\,\text{Cos}[2\,(c+d\,x)]-300\,a^3\,\text{Cos}[3\,(c+d\,x)]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]+225\,a\,b^2\,\text{Cos}[3\,(c+d\,x)]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]-60\,a^3\,\text{Cos}[5\,(c+d\,x)]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]+45\,a\,b^2\,\text{Cos}[5\,(c+d\,x)]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]-150\,a\,\left(4\,a^2-3\,b^2\right)\,\text{Cos}[c+d\,x]\,\Big(\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]-\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]-\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]\Big)+300\,a^3\,\text{Cos}[3\,(c+d\,x)]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]-225\,a\,b^2\,\text{Cos}[3\,(c+d\,x)]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]+60\,a^3\,\text{Cos}[5\,(c+d\,x)]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]-45\,a\,b^2\,\text{Cos}[5\,(c+d\,x)]\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c+d\,x)\Big]+\text{Sin}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big]+240\,a^3\,\text{Sin}[2\,(c+d\,x)]+540\,a\,b^2\,\text{Sin}[2\,(c+d\,x)]+120\,a^3\,\text{Sin}[4\,(c+d\,x)]-90\,a\,b^2\,\text{Sin}[4\,(c+d\,x)]\Big)$$

Problem 70: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^8\,(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^3\,dx$$

Optimal (type 3, 210 leaves, 14 steps):

$$\frac{3\,a^3\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}-\frac{3\,a\,b^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{16\,d}+\frac{3\,a^2\,b\,\text{Sec}[c+d\,x]^5}{5\,d}-\frac{b^3\,\text{Sec}[c+d\,x]^5}{5\,d}+\frac{b^3\,\text{Sec}[c+d\,x]^7}{7\,d}+\frac{3\,a^3\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}-\frac{3\,a\,b^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{16\,d}+\frac{a^3\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}-\frac{a\,b^2\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a\,b^2\,\text{Sec}[c+d\,x]^5\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 637 leaves):

$$\frac{1}{35840\,d}\,\mathrm{Sec}[c+d\,x]^7\,\Big(10752\,a^2\,b+1536\,b^3+3584\,\left(3\,a^2\,b-b^3\right)\,\mathrm{Cos}\left[2\,\left(c+d\,x\right)\right]-$$
$$4410\,a^3\,\mathrm{Cos}\left[3\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+$$
$$2205\,a\,b^2\,\mathrm{Cos}\left[3\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]-$$
$$1470\,a^3\,\mathrm{Cos}\left[5\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+$$
$$735\,a\,b^2\,\mathrm{Cos}\left[5\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]-$$
$$210\,a^3\,\mathrm{Cos}\left[7\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+105\,a\,b^2\,\mathrm{Cos}\left[7\,\left(c+d\,x\right)\right]$$
$$\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]-3675\,a\,\left(2\,a^2-b^2\right)\,\mathrm{Cos}[c+d\,x]$$
$$\left(\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]-\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]\right)+$$
$$4410\,a^3\,\mathrm{Cos}\left[3\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]-$$
$$2205\,a\,b^2\,\mathrm{Cos}\left[3\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+$$
$$1470\,a^3\,\mathrm{Cos}\left[5\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]-$$
$$735\,a\,b^2\,\mathrm{Cos}\left[5\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+$$
$$210\,a^3\,\mathrm{Cos}\left[7\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]-$$
$$105\,a\,b^2\,\mathrm{Cos}\left[7\,\left(c+d\,x\right)\right]\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+$$
$$4340\,a^3\,\mathrm{Sin}\left[2\,\left(c+d\,x\right)\right]+6790\,a\,b^2\,\mathrm{Sin}\left[2\,\left(c+d\,x\right)\right]+2800\,a^3\,\mathrm{Sin}\left[4\,\left(c+d\,x\right)\right]-$$
$$1400\,a\,b^2\,\mathrm{Sin}\left[4\,\left(c+d\,x\right)\right]+420\,a^3\,\mathrm{Sin}\left[6\,\left(c+d\,x\right)\right]-210\,a\,b^2\,\mathrm{Sin}\left[6\,\left(c+d\,x\right)\right]\Big)$$

Problem 72: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d\,x]^{10}\,\left(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x]\right)^3\,dx$$

Optimal (type 3, 259 leaves, 16 steps):

$$\frac{5\,a^3\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{16\,d}-\frac{15\,a\,b^2\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{128\,d}+\frac{3\,a^2\,b\,\mathrm{Sec}[c+d\,x]^7}{7\,d}-\frac{b^3\,\mathrm{Sec}[c+d\,x]^7}{7\,d}+$$
$$\frac{b^3\,\mathrm{Sec}[c+d\,x]^9}{9\,d}+\frac{5\,a^3\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{16\,d}-\frac{15\,a\,b^2\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{128\,d}+$$
$$\frac{5\,a^3\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{24\,d}-\frac{5\,a\,b^2\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{64\,d}+$$
$$\frac{a^3\,\mathrm{Sec}[c+d\,x]^5\,\mathrm{Tan}[c+d\,x]}{6\,d}-\frac{a\,b^2\,\mathrm{Sec}[c+d\,x]^5\,\mathrm{Tan}[c+d\,x]}{16\,d}+\frac{3\,a\,b^2\,\mathrm{Sec}[c+d\,x]^7\,\mathrm{Tan}[c+d\,x]}{8\,d}$$

Result (type 3, 1924 leaves):

$$-\frac{5\,b\,\left(-216\,a^2+23\,b^2\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3}{8064\,d\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3}-$$

$$\left(5\,\left(8\,a^3-3\,a\,b^2\right)\,\text{Cos}[c+d\,x]^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(128\,d\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+$$

$$\left(5\,\left(8\,a^3-3\,a\,b^2\right)\,\text{Cos}[c+d\,x]^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(128\,d\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+\left(\left(27\,a\,b^2+4\,b^3\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(1152\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^8\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+$$

$$\left(\left(84\,a^3+108\,a^2\,b+63\,a\,b^2-b^3\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(4032\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^6\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+$$

$$\left(\left(336\,a^3+288\,a^2\,b-63\,a\,b^2-26\,b^3\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(5376\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+$$

$$\left(5\,\left(504\,a^3+216\,a^2\,b-189\,a\,b^2-23\,b^3\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(16128\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+$$

$$\left(b^3\,\text{Cos}[c+d\,x]^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(144\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^9\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)-$$

$$\left(b^3\,\text{Cos}[c+d\,x]^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(144\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^9\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+$$

$$\left(\left(-27\,a\,b^2+4\,b^3\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(1152\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^8\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+$$

$$\left(\left(-84\,a^3+108\,a^2\,b-63\,a\,b^2-b^3\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(4032\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^6\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)+$$

$$\left(\left(-336\,a^3+288\,a^2\,b+63\,a\,b^2-26\,b^3\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$
$$\left(5376\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3\right)-$$

$$\left(5\,\left(504\,a^3-216\,a^2\,b-189\,a\,b^2+23\,b^3\right)\,\text{Cos}[c+d\,x]^3\,\left(a+b\,\text{Tan}[c+d\,x]\right)^3\right)\Big/$$

$$\left(16128\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2 (a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)+$$
$$\left(\mathrm{Cos}[c+d x]^3 \left(144 a^2 b\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]-13 b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\,\mathrm{Tan}[c+d x])^3\right)\Big/$$
$$\left(1344\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^5 (a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)+$$
$$\left(\mathrm{Cos}[c+d x]^3 \left(108 a^2 b\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]-b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\,\mathrm{Tan}[c+d x])^3\right)\Big/$$
$$\left(2016\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^7 (a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)+$$
$$\left(\mathrm{Cos}[c+d x]^3 \left(-108 a^2 b\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\,\mathrm{Tan}[c+d x])^3\right)\Big/$$
$$\left(2016\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^7 (a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)+$$
$$\left(\mathrm{Cos}[c+d x]^3 \left(-144 a^2 b\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+13 b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\,\mathrm{Tan}[c+d x])^3\right)\Big/$$
$$\left(1344\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^5 (a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)-$$
$$\left(5\,\mathrm{Cos}[c+d x]^3 \left(-216 a^2 b\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+23 b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\,\mathrm{Tan}[c+d x])^3\right)\Big/$$
$$\left(8064\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3 (a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)-$$
$$\left(5\,\mathrm{Cos}[c+d x]^3 \left(-216 a^2 b\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+23 b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\,\mathrm{Tan}[c+d x])^3\right)\Big/$$
$$\left(8064\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)+$$
$$\left(5\,\mathrm{Cos}[c+d x]^3 \left(-216 a^2 b\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+23 b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\,\mathrm{Tan}[c+d x])^3\right)\Big/$$
$$\left(8064\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3 (a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)+$$
$$\left(5\,\mathrm{Cos}[c+d x]^3 \left(-216 a^2 b\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]+23 b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\,\mathrm{Tan}[c+d x])^3\right)\Big/$$
$$\left(8064\, d \left(\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a\,\mathrm{Cos}[c+d x]+b\,\mathrm{Sin}[c+d x])^3\right)$$

Problem 77: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 301 leaves, 19 steps):

$$\frac{5 a^4 x}{16}+\frac{3}{8} a^2 b^2 x+\frac{b^4 x}{16}-\frac{2 a^3 b \text{Cos}[c+d x]^6}{3 d}+\frac{5 a^4 \text{Cos}[c+d x] \text{Sin}[c+d x]}{16 d}+\frac{3 a^2 b^2 \text{Cos}[c+d x] \text{Sin}[c+d x]}{8 d}+\frac{b^4 \text{Cos}[c+d x] \text{Sin}[c+d x]}{16 d}+\frac{5 a^4 \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{24 d}+\frac{a^2 b^2 \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{4 d}-\frac{b^4 \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{8 d}+\frac{a^4 \text{Cos}[c+d x]^5 \text{Sin}[c+d x]}{6 d}-\frac{a^2 b^2 \text{Cos}[c+d x]^5 \text{Sin}[c+d x]}{d}-\frac{b^4 \text{Cos}[c+d x]^3 \text{Sin}[c+d x]^3}{6 d}+\frac{a b^3 \text{Sin}[c+d x]^4}{d}-\frac{2 a b^3 \text{Sin}[c+d x]^6}{3 d}$$

Result (type 3, 178 leaves):

$$\frac{1}{192 d}\Big(12 (a-i b) (a+i b) (5 a^2+b^2) (c+d x)-12 a b (5 a^2+3 b^2) \text{Cos}[2 (c+d x)]-24 a^3 b \text{Cos}[4 (c+d x)]-4 a b (a^2-b^2) \text{Cos}[6 (c+d x)]+3 (15 a^4+6 a^2 b^2-b^4) \text{Sin}[2 (c+d x)]+3 (3 a^4-6 a^2 b^2-b^4) \text{Sin}[4 (c+d x)]+(a^4-6 a^2 b^2+b^4) \text{Sin}[6 (c+d x)]\Big)$$

Problem 84: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^5 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4 \, dx$$

Optimal (type 3, 168 leaves, 12 steps):

$$\frac{a^4 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{3 a^2 b^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{d}+\frac{3 b^4 \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{4 a^3 b \text{Sec}[c+d x]}{d}-\frac{4 a b^3 \text{Sec}[c+d x]}{d}+\frac{4 a b^3 \text{Sec}[c+d x]^3}{3 d}+\frac{3 a^2 b^2 \text{Sec}[c+d x] \text{Tan}[c+d x]}{d}-\frac{3 b^4 \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{b^4 \text{Sec}[c+d x] \text{Tan}[c+d x]^3}{4 d}$$

Result (type 3, 936 leaves):

$$\frac{2\,a\,b\,\left(6\,a^2-5\,b^2\right)\,\mathrm{Cos}[c+d\,x]^4\,\left(a+b\,\mathrm{Tan}[c+d\,x]\right)^4}{3\,d\,\left(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x]\right)^4}+$$

$$\left(\left(-8\,a^4+24\,a^2\,b^2-3\,b^4\right)\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right.$$

$$\left.\left(a+b\,\mathrm{Tan}[c+d\,x]\right)^4\right)\Big/\left(8\,d\,\left(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x]\right)^4\right)+\left(\left(8\,a^4-24\,a^2\,b^2+3\,b^4\right)\right.$$

$$\left.\mathrm{Cos}[c+d\,x]^4\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\left(a+b\,\mathrm{Tan}[c+d\,x]\right)^4\right)\Big/$$

$$\left(8\,d\,\left(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x]\right)^4\right)+\left(b^4\,\mathrm{Cos}[c+d\,x]^4\,\left(a+b\,\mathrm{Tan}[c+d\,x]\right)^4\right)\Big/$$

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

$$\left(\left(72\,a^2\,b^2+16\,a\,b^3-15\,b^4\right)\,\mathrm{Cos}[c+d\,x]^4\,\left(a+b\,\mathrm{Tan}[c+d\,x]\right)^4\right)\Big/$$

$$\left(48\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\,\left(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x]\right)^4\right)+$$

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

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

$$\left(b^4\,\mathrm{Cos}[c+d\,x]^4\,\left(a+b\,\mathrm{Tan}[c+d\,x]\right)^4\right)\Big/$$

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

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

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

$$\left(\left(-72\,a^2\,b^2+16\,a\,b^3+15\,b^4\right)\,\mathrm{Cos}[c+d\,x]^4\,\left(a+b\,\mathrm{Tan}[c+d\,x]\right)^4\right)\Big/$$

$$\left(48\,d\,\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\,\left(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x]\right)^4\right)+$$

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

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

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

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

Problem 85: Result more than twice size of optimal antiderivative.

$$\int \mathrm{Sec}[c+d\,x]^6\,\left(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x]\right)^4\,dx$$

Optimal (type 3, 30 leaves, 2 steps):

$$\frac{(b + a \,\text{Cot}[c + d\,x])^5 \,\text{Tan}[c + d\,x]^5}{5\,b\,d}$$

Result (type 3, 131 leaves):

$$\left((a + b\,\text{Tan}[c + d\,x])^4 \left(10\,a\,b\,(a^2 - b^2)\,\text{Cos}[c + d\,x]^2 + (5\,a^4 - 10\,a^2\,b^2 + b^4)\,\text{Cos}[c + d\,x]^3\,\text{Sin}[c + d\,x] + b^2 \left((5\,a^2 - b^2)\,\text{Sin}[2\,(c + d\,x)] + b\,(5\,a + b\,\text{Tan}[c + d\,x])\right)\right)\right) \Big/ \left(5\,d\,(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x])^4\right)$$

Problem 86: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c + d\,x]^7\,(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x])^4\,dx$$

Optimal (type 3, 258 leaves, 16 steps):

$$\frac{a^4\,\text{ArcTanh}[\text{Sin}[c + d\,x]]}{2\,d} - \frac{3\,a^2\,b^2\,\text{ArcTanh}[\text{Sin}[c + d\,x]]}{4\,d} + \frac{b^4\,\text{ArcTanh}[\text{Sin}[c + d\,x]]}{16\,d} + \frac{4\,a^3\,b\,\text{Sec}[c + d\,x]^3}{3\,d} - \frac{4\,a\,b^3\,\text{Sec}[c + d\,x]^3}{3\,d} + \frac{4\,a\,b^3\,\text{Sec}[c + d\,x]^5}{5\,d} + \frac{a^4\,\text{Sec}[c + d\,x]\,\text{Tan}[c + d\,x]}{2\,d} - \frac{3\,a^2\,b^2\,\text{Sec}[c + d\,x]\,\text{Tan}[c + d\,x]}{4\,d} + \frac{b^4\,\text{Sec}[c + d\,x]\,\text{Tan}[c + d\,x]}{16\,d} + \frac{3\,a^2\,b^2\,\text{Sec}[c + d\,x]^3\,\text{Tan}[c + d\,x]}{2\,d} - \frac{b^4\,\text{Sec}[c + d\,x]^3\,\text{Tan}[c + d\,x]}{8\,d} + \frac{b^4\,\text{Sec}[c + d\,x]^3\,\text{Tan}[c + d\,x]^3}{6\,d}$$

Result (type 3, 1342 leaves):

$$\frac{a\,b\,(20\,a^2 - 11\,b^2)\,\text{Cos}[c + d\,x]^4\,(a + b\,\text{Tan}[c + d\,x])^4}{30\,d\,(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x])^4} +$$

$$\left((-8\,a^4 + 12\,a^2\,b^2 - b^4)\,\text{Cos}[c + d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c + d\,x)\right] - \text{Sin}\left[\frac{1}{2}\,(c + d\,x)\right]\right] (a + b\,\text{Tan}[c + d\,x])^4\right) \Big/ \left(16\,d\,(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x])^4\right) +$$

$$\left((8\,a^4 - 12\,a^2\,b^2 + b^4)\,\text{Cos}[c + d\,x]^4\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c + d\,x)\right] + \text{Sin}\left[\frac{1}{2}\,(c + d\,x)\right]\right] (a + b\,\text{Tan}[c + d\,x])^4\right) \Big/ \left(16\,d\,(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x])^4\right) + \left(b^4\,\text{Cos}[c + d\,x]^4\,(a + b\,\text{Tan}[c + d\,x])^4\right) \Big/ \left(48\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c + d\,x)\right] - \text{Sin}\left[\frac{1}{2}\,(c + d\,x)\right]\right)^6 (a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x])^4\right) +$$

$$\left((30\,a^2\,b^2 + 8\,a\,b^3 - 5\,b^4)\,\text{Cos}[c + d\,x]^4\,(a + b\,\text{Tan}[c + d\,x])^4\right) \Big/ \left(80\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c + d\,x)\right] - \text{Sin}\left[\frac{1}{2}\,(c + d\,x)\right]\right)^4 (a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x])^4\right) +$$

$$\left((120\,a^4 + 160\,a^3\,b - 180\,a^2\,b^2 - 88\,a\,b^3 + 15\,b^4)\,\text{Cos}[c + d\,x]^4\,(a + b\,\text{Tan}[c + d\,x])^4\right) \Big/ \left(480\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c + d\,x)\right] - \text{Sin}\left[\frac{1}{2}\,(c + d\,x)\right]\right)^2 (a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x])^4\right) +$$

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

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

$$\left(b^4\,\text{Cos}[c+d\,x]^4\,(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$

$$\left(48\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^6(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)-$$

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

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

$$\left(\left(-30\,a^2\,b^2+8\,a\,b^3+5\,b^4\right)\text{Cos}[c+d\,x]^4\,(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$

$$\left(80\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$

$$\left(\left(-120\,a^4+160\,a^3\,b+180\,a^2\,b^2-88\,a\,b^3-15\,b^4\right)\text{Cos}[c+d\,x]^4\,(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$

$$\left(480\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$

$$\left(\text{Cos}[c+d\,x]^4\left(20\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-11\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$

$$\left(30\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$

$$\left(\text{Cos}[c+d\,x]^4\left(20\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-11\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$

$$\left(30\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$

$$\left(\text{Cos}[c+d\,x]^4\left(-20\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+11\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$

$$\left(30\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$

$$\left(\text{Cos}[c+d\,x]^4\left(-20\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+11\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$

$$\left(30\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)$$

Problem 88: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d\,x]^9\,(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\,dx$$

Optimal (type 3, 330 leaves, 19 steps):

$$\frac{3 a^4 \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}-\frac{3 a^2 b^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}+\frac{3 b^4 \text{ArcTanh}[\text{Sin}[c+d x]]}{128 d}+\frac{4 a^3 b \text{Sec}[c+d x]^5}{5 d}-\frac{4 a b^3 \text{Sec}[c+d x]^5}{5 d}+\frac{4 a b^3 \text{Sec}[c+d x]^7}{7 d}+\frac{3 a^4 \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}-\frac{3 a^2 b^2 \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{3 b^4 \text{Sec}[c+d x] \text{Tan}[c+d x]}{128 d}+\frac{a^4 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 d}-\frac{a^2 b^2 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 d}+\frac{b^4 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{64 d}+\frac{a^2 b^2 \text{Sec}[c+d x]^5 \text{Tan}[c+d x]}{d}-\frac{b^4 \text{Sec}[c+d x]^5 \text{Tan}[c+d x]}{16 d}+\frac{b^4 \text{Sec}[c+d x]^5 \text{Tan}[c+d x]^3}{8 d}$$

Result (type 3, 1732 leaves):

$$\frac{a b \left(42 a^2-17 b^2\right) \text{Cos}[c+d x]^4 (a+b \text{Tan}[c+d x])^4}{140 d (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4}-$$
$$\left(3 \left(16 a^4-16 a^2 b^2+b^4\right) \text{Cos}[c+d x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Tan}[c+d x])^4\right) \Big/ \left(128 d (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4\right)+\left(3 \left(16 a^4-16 a^2 b^2+b^4\right) \text{Cos}[c+d x]^4 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \text{Tan}[c+d x])^4\right) \Big/$$
$$\left(128 d (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4\right)+\left(b^4 \text{Cos}[c+d x]^4 (a+b \text{Tan}[c+d x])^4\right) \Big/$$
$$\left(128 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^8 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4\right)+$$
$$\left(\left(56 a^2 b^2+16 a b^3-7 b^4\right) \text{Cos}[c+d x]^4 (a+b \text{Tan}[c+d x])^4\right) \Big/$$
$$\left(448 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^6 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4\right)+$$
$$\left(\left(560 a^4+896 a^3 b-256 a b^3-35 b^4\right) \text{Cos}[c+d x]^4 (a+b \text{Tan}[c+d x])^4\right) \Big/$$
$$\left(8960 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4\right)+$$
$$\left(\left(1680 a^4+1344 a^3 b-1680 a^2 b^2-544 a b^3+105 b^4\right) \text{Cos}[c+d x]^4 (a+b \text{Tan}[c+d x])^4\right) \Big/$$
$$\left(8960 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4\right)+$$
$$\left(a b^3 \text{Cos}[c+d x]^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right] (a+b \text{Tan}[c+d x])^4\right) \Big/$$
$$\left(14 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^7 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4\right)-$$
$$\left(b^4 \text{Cos}[c+d x]^4 (a+b \text{Tan}[c+d x])^4\right) \Big/$$
$$\left(128 d \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^8 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^4\right)-$$
$$\left(a b^3 \text{Cos}[c+d x]^4 \text{Sin}\left[\frac{1}{2} (c+d x)\right] (a+b \text{Tan}[c+d x])^4\right) \Big/$$

$$\left(14\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^7 (a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\left(-56\,a^2\,b^2+16\,a\,b^3+7\,b^4\right)\text{Cos}[c+d\,x]^4\,(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(448\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^6 (a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\left(-560\,a^4+896\,a^3\,b-256\,a\,b^3+35\,b^4\right)\text{Cos}[c+d\,x]^4\,(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(8960\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^4 (a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\left(-1680\,a^4+1344\,a^3\,b+1680\,a^2\,b^2-544\,a\,b^3-105\,b^4\right)\text{Cos}[c+d\,x]^4\,(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(8960\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2 (a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\text{Cos}[c+d\,x]^4\left(42\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-17\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(140\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3 (a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\text{Cos}[c+d\,x]^4\left(42\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-17\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(140\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\text{Cos}[c+d\,x]^4\left(7\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-2\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(35\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^5 (a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\text{Cos}[c+d\,x]^4\left(-7\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+2\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(35\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^5 (a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\text{Cos}[c+d\,x]^4\left(-42\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+17\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(140\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3 (a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)+$$
$$\left(\text{Cos}[c+d\,x]^4\left(-42\,a^3\,b\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]+17\,a\,b^3\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\text{Tan}[c+d\,x])^4\right)\Big/$$
$$\left(140\,d\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^4\right)$$

Problem 94: Result unnecessarily involves imaginary or complex numbers.

$$\int \text{Cos}[c+d\,x]^3\,(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^5\,dx$$

Optimal (type 3, 426 leaves, 25 steps):

$$\frac{35 a^5 x}{128}+\frac{25}{64} a^3 b^2 x+\frac{15}{128} a b^4 x-\frac{5 a^2 b^3 \text{Cos}[c+d x]^6}{3 d}-\frac{5 a^4 b \text{Cos}[c+d x]^8}{8 d}+\frac{5 a^2 b^3 \text{Cos}[c+d x]^8}{4 d}+\frac{35 a^5 \text{Cos}[c+d x] \text{Sin}[c+d x]}{128 d}+\frac{25 a^3 b^2 \text{Cos}[c+d x] \text{Sin}[c+d x]}{64 d}+\frac{15 a b^4 \text{Cos}[c+d x] \text{Sin}[c+d x]}{128 d}+\frac{35 a^5 \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{192 d}+\frac{25 a^3 b^2 \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{96 d}+\frac{5 a b^4 \text{Cos}[c+d x]^3 \text{Sin}[c+d x]}{64 d}+\frac{7 a^5 \text{Cos}[c+d x]^5 \text{Sin}[c+d x]}{48 d}+\frac{5 a^3 b^2 \text{Cos}[c+d x]^5 \text{Sin}[c+d x]}{24 d}-\frac{5 a b^4 \text{Cos}[c+d x]^5 \text{Sin}[c+d x]}{16 d}+\frac{a^5 \text{Cos}[c+d x]^7 \text{Sin}[c+d x]}{8 d}-\frac{5 a^3 b^2 \text{Cos}[c+d x]^7 \text{Sin}[c+d x]}{4 d}-\frac{5 a b^4 \text{Cos}[c+d x]^5 \text{Sin}[c+d x]^3}{8 d}+\frac{b^5 \text{Sin}[c+d x]^6}{6 d}-\frac{b^5 \text{Sin}[c+d x]^8}{8 d}$$

Result (type 3, 259 leaves):

$$\frac{1}{3072 d}\Big(120 a (a-i b) (a+i b) \left(7 a^2+3 b^2\right) (c+d x)-24 b \left(35 a^4+30 a^2 b^2+3 b^4\right) \text{Cos}[2 (c+d x)]+12 b \left(-35 a^4-10 a^2 b^2+b^4\right) \text{Cos}[4 (c+d x)]+8 b \left(-15 a^4+10 a^2 b^2+b^4\right) \text{Cos}[6 (c+d x)]-3 b \left(5 a^4-10 a^2 b^2+b^4\right) \text{Cos}[8 (c+d x)]+96 a^3 \left(7 a^2+5 b^2\right) \text{Sin}[2 (c+d x)]+24 a \left(7 a^4-10 a^2 b^2-5 b^4\right) \text{Sin}[4 (c+d x)]+32 a^3 \left(a^2-5 b^2\right) \text{Sin}[6 (c+d x)]+3 a \left(a^4-10 a^2 b^2+5 b^4\right) \text{Sin}[8 (c+d x)]\Big)$$

Problem 98: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x] (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^5 \, dx$$

Optimal (type 3, 170 leaves, 8 steps):

$$\frac{1}{8} a \left(3 a^4+10 a^2 b^2+15 b^4\right) x-\frac{b^5 \text{Log}[\text{Sin}[c+d x]]}{d}+\frac{b^5 \text{Log}[\text{Tan}[c+d x]]}{d}+\frac{\left(4 b \left(5 a^4-b^4\right)+5 a \left(a^2-3 b^2\right) \left(a^2+b^2\right) \text{Cot}[c+d x]\right) \text{Sin}[c+d x]^2}{8 d}-\frac{1}{4 d}\left(b \left(5 a^4-10 a^2 b^2+b^4\right)+a \left(a^4-10 a^2 b^2+5 b^4\right) \text{Cot}[c+d x]\right) \text{Sin}[c+d x]^4$$

Result (type 3, 408 leaves):

$$\frac{a\,(3 a^4+10 a^2 b^2+15 b^4)\,(c+d x)\,\text{Cos}[c+d x]^5\,(a+b\,\text{Tan}[c+d x])^5}{8 d\,(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x])^5}-$$
$$\left(b\,(5 a^4+10 a^2 b^2-3 b^4)\,\text{Cos}[c+d x]^5\,\text{Cos}[2\,(c+d x)]\,(a+b\,\text{Tan}[c+d x])^5\right)\Big/$$
$$\left(8 d\,(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x])^5\right)-$$
$$\left(b\,(5 a^4-10 a^2 b^2+b^4)\,\text{Cos}[c+d x]^5\,\text{Cos}[4\,(c+d x)]\,(a+b\,\text{Tan}[c+d x])^5\right)\Big/$$
$$\left(32 d\,(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x])^5\right)-\frac{b^5\,\text{Cos}[c+d x]^5\,\text{Log}[\text{Cos}[c+d x]]\,(a+b\,\text{Tan}[c+d x])^5}{d\,(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x])^5}+$$
$$\frac{a\,(a^4-5 b^4)\,\text{Cos}[c+d x]^5\,\text{Sin}[2\,(c+d x)]\,(a+b\,\text{Tan}[c+d x])^5}{4 d\,(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x])^5}+$$
$$\left(a\,(a^4-10 a^2 b^2+5 b^4)\,\text{Cos}[c+d x]^5\,\text{Sin}[4\,(c+d x)]\,(a+b\,\text{Tan}[c+d x])^5\right)\Big/$$
$$\left(32 d\,(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x])^5\right)$$

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

$$\int \text{Sec}[c+d x]^2\,(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x])^5\,dx$$

Optimal (type 3, 205 leaves, 17 steps):

$$\frac{5 a b^4\,\text{ArcTanh}[\text{Sin}[c+d x]]}{d}-\frac{10 a^2 b^3\,\text{Cos}[c+d x]}{d}+\frac{2 b^5\,\text{Cos}[c+d x]}{d}-\frac{5 a^4 b\,\text{Cos}[c+d x]^3}{3 d}+$$
$$\frac{10 a^2 b^3\,\text{Cos}[c+d x]^3}{3 d}-\frac{b^5\,\text{Cos}[c+d x]^3}{3 d}+\frac{b^5\,\text{Sec}[c+d x]}{d}+\frac{a^5\,\text{Sin}[c+d x]}{d}-$$
$$\frac{5 a b^4\,\text{Sin}[c+d x]}{d}-\frac{a^5\,\text{Sin}[c+d x]^3}{3 d}+\frac{10 a^3 b^2\,\text{Sin}[c+d x]^3}{3 d}-\frac{5 a b^4\,\text{Sin}[c+d x]^3}{3 d}$$

Result (type 3, 632 leaves):

$$\frac{b^5 \operatorname{Cos}[c+d x]^5 (a+b \operatorname{Tan}[c+d x])^5}{d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}-\frac{b (5 a^4+30 a^2 b^2-7 b^4) \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Tan}[c+d x])^5}{4 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}-$$
$$\left(b (5 a^4-10 a^2 b^2+b^4) \operatorname{Cos}[c+d x]^5 \operatorname{Cos}[3 (c+d x)] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(12 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)-$$
$$\left(5 a b^4 \operatorname{Cos}[c+d x]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\left(5 a b^4 \operatorname{Cos}[c+d x]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+\left(b^5 \operatorname{Cos}[c+d x]^5 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/$$
$$\left(d \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right) (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)-$$
$$\left(b^5 \operatorname{Cos}[c+d x]^5 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(d \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right) (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\left(a (3 a^4+10 a^2 b^2-25 b^4) \operatorname{Cos}[c+d x]^5 \operatorname{Sin}[c+d x] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(4 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\left(a (a^4-10 a^2 b^2+5 b^4) \operatorname{Cos}[c+d x]^5 \operatorname{Sin}[3 (c+d x)] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(12 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)$$

Problem 100: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Sec}[c+d x]^3 (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5 \, dx$$

Optimal (type 3, 169 leaves, 7 steps):

$$\frac{1}{2} a (a^4+10 a^2 b^2-15 b^4) x-\frac{2 b^3 (5 a^2-b^2) \operatorname{Log}[\operatorname{Sin}[c+d x]]}{d}+\frac{2 b^3 (5 a^2-b^2) \operatorname{Log}[\operatorname{Tan}[c+d x]]}{d}+$$
$$\frac{1}{2 d}\left(b (5 a^4-10 a^2 b^2+b^4)+a (a^4-10 a^2 b^2+5 b^4) \operatorname{Cot}[c+d x]\right) \operatorname{Sin}[c+d x]^2+$$
$$\frac{5 a b^4 \operatorname{Tan}[c+d x]}{d}+\frac{b^5 \operatorname{Tan}[c+d x]^2}{2 d}$$

Result (type 3, 382 leaves):

$$\frac{b^5 \operatorname{Cos}[c+d x]^3 (a+b \operatorname{Tan}[c+d x])^5}{2 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}+$$

$$\frac{a (a^4+10 a^2 b^2-15 b^4) (c+d x) \operatorname{Cos}[c+d x]^5 (a+b \operatorname{Tan}[c+d x])^5}{2 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}-$$

$$\left(b (5 a^4-10 a^2 b^2+b^4) \operatorname{Cos}[c+d x]^5 \operatorname{Cos}[2 (c+d x)] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(4 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)-$$

$$\frac{2 (5 a^2 b^3-b^5) \operatorname{Cos}[c+d x]^5 \operatorname{Log}[\operatorname{Cos}[c+d x]] (a+b \operatorname{Tan}[c+d x])^5}{d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}+$$

$$\frac{5 a b^4 \operatorname{Cos}[c+d x]^4 \operatorname{Sin}[c+d x] (a+b \operatorname{Tan}[c+d x])^5}{d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}+$$

$$\left(a (a^4-10 a^2 b^2+5 b^4) \operatorname{Cos}[c+d x]^5 \operatorname{Sin}[2 (c+d x)] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(4 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)$$

Problem 101: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Sec}[c+d x]^4 (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5 \, dx$$

Optimal (type 3, 204 leaves, 17 steps):

$$\frac{10 a^3 b^2 \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{d}-\frac{15 a b^4 \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 d}-\frac{5 a^4 b \operatorname{Cos}[c+d x]}{d}+$$

$$\frac{10 a^2 b^3 \operatorname{Cos}[c+d x]}{d}-\frac{b^5 \operatorname{Cos}[c+d x]}{d}+\frac{10 a^2 b^3 \operatorname{Sec}[c+d x]}{d}-\frac{2 b^5 \operatorname{Sec}[c+d x]}{d}+\frac{b^5 \operatorname{Sec}[c+d x]^3}{3 d}+$$

$$\frac{a^5 \operatorname{Sin}[c+d x]}{d}-\frac{10 a^3 b^2 \operatorname{Sin}[c+d x]}{d}+\frac{15 a b^4 \operatorname{Sin}[c+d x]}{2 d}+\frac{5 a b^4 \operatorname{Sin}[c+d x] \operatorname{Tan}[c+d x]^2}{2 d}$$

Result (type 3, 892 leaves):

$$-\frac{b^3 \left(-60 a^2+11 b^2\right) \operatorname{Cos}[c+d x]^5 (a+b \operatorname{Tan}[c+d x])^5}{6 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}-\frac{b \left(5 a^4-10 a^2 b^2+b^4\right) \operatorname{Cos}[c+d x]^6 (a+b \operatorname{Tan}[c+d x])^5}{d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}-$$
$$\left(5 \left(4 a^3 b^2-3 a b^4\right) \operatorname{Cos}[c+d x]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(2 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\left(5 \left(4 a^3 b^2-3 a b^4\right) \operatorname{Cos}[c+d x]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(2 d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+\left(\left(15 a b^4+b^5\right) \operatorname{Cos}[c+d x]^5 (a+b \operatorname{Tan}[c+d x])^5\right) \Big/$$
$$\left(12 d \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2 (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\left(b^5 \operatorname{Cos}[c+d x]^5 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(6 d \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3 (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)-$$
$$\left(b^5 \operatorname{Cos}[c+d x]^5 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right] (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(6 d \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3 (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\left(\left(-15 a b^4+b^5\right) \operatorname{Cos}[c+d x]^5 (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(12 d \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2 (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\left(\operatorname{Cos}[c+d x]^5 \left(60 a^2 b^3 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]-11 b^5 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right) (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(6 d \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right) (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\left(\operatorname{Cos}[c+d x]^5 \left(-60 a^2 b^3 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]+11 b^5 \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right) (a+b \operatorname{Tan}[c+d x])^5\right) \Big/ \left(6 d \left(\operatorname{Cos}\left[\frac{1}{2} (c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]\right) (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5\right)+$$
$$\frac{a \left(a^4-10 a^2 b^2+5 b^4\right) \operatorname{Cos}[c+d x]^5 \operatorname{Sin}[c+d x] (a+b \operatorname{Tan}[c+d x])^5}{d (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5}$$

Problem 102: Result more than twice size of optimal antiderivative.

$$\int \operatorname{Sec}[c+d x]^5 (a \operatorname{Cos}[c+d x]+b \operatorname{Sin}[c+d x])^5 \, dx$$

Optimal (type 3, 147 leaves, 6 steps):

$$a\left(a^4-10a^2b^2+5b^4\right)x-\frac{b\left(5a^4-10a^2b^2+b^4\right)\text{Log}[\text{Cos}[c+dx]]}{d}+\frac{4ab^2\left(a^2-b^2\right)\text{Tan}[c+dx]}{d}+\frac{b\left(3a^2-b^2\right)(a+b\,\text{Tan}[c+dx])^2}{2d}+\frac{2ab\,(a+b\,\text{Tan}[c+dx])^3}{3d}+\frac{b\,(a+b\,\text{Tan}[c+dx])^4}{4d}$$

Result (type 3, 369 leaves):

$$\frac{b^5\text{Cos}[c+dx]\,(a+b\,\text{Tan}[c+dx])^5}{4d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5}-\frac{b^3\left(-5a^2+b^2\right)\text{Cos}[c+dx]^3\,(a+b\,\text{Tan}[c+dx])^5}{d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5}+\frac{a\left(a^4-10a^2b^2+5b^4\right)(c+dx)\,\text{Cos}[c+dx]^5\,(a+b\,\text{Tan}[c+dx])^5}{d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5}+\left(\left(-5a^4b+10a^2b^3-b^5\right)\text{Cos}[c+dx]^5\,\text{Log}[\text{Cos}[c+dx]]\,(a+b\,\text{Tan}[c+dx])^5\right)\Big/\left(d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5\right)+\frac{5ab^4\text{Cos}[c+dx]^2\,\text{Sin}[c+dx]\,(a+b\,\text{Tan}[c+dx])^5}{3d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5}+\left(10\,\text{Cos}[c+dx]^4\left(3a^3b^2\,\text{Sin}[c+dx]-2ab^4\,\text{Sin}[c+dx]\right)(a+b\,\text{Tan}[c+dx])^5\right)\Big/\left(3d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5\right)$$

Problem 103: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+dx]^6\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5\,dx$$

Optimal (type 3, 224 leaves, 15 steps):

$$\frac{a^5\text{ArcTanh}[\text{Sin}[c+dx]]}{d}-\frac{5a^3b^2\text{ArcTanh}[\text{Sin}[c+dx]]}{d}+\frac{15ab^4\text{ArcTanh}[\text{Sin}[c+dx]]}{8d}+\frac{5a^4b\,\text{Sec}[c+dx]}{d}-\frac{10a^2b^3\text{Sec}[c+dx]}{d}+\frac{b^5\text{Sec}[c+dx]}{d}+\frac{10a^2b^3\text{Sec}[c+dx]^3}{3d}-\frac{2b^5\text{Sec}[c+dx]^3}{3d}+\frac{b^5\text{Sec}[c+dx]^5}{5d}+\frac{5a^3b^2\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{d}-\frac{15ab^4\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{8d}+\frac{5ab^4\text{Sec}[c+dx]\,\text{Tan}[c+dx]^3}{4d}$$

Result (type 3, 1219 leaves):

$$\frac{b\left(600a^4-1000a^2b^2+89b^4\right)\text{Cos}[c+dx]^5\,(a+b\,\text{Tan}[c+dx])^5}{120d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5}+\left(\left(-8a^5+40a^3b^2-15ab^4\right)\text{Cos}[c+dx]^5\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right](a+b\,\text{Tan}[c+dx])^5\right)\Big/\left(8d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5\right)+\left(\left(8a^5-40a^3b^2+15ab^4\right)\text{Cos}[c+dx]^5\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right](a+b\,\text{Tan}[c+dx])^5\right)\Big/\left(8d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^5\right)+$$

$$\left(\left(25\,a\,b^4+2\,b^5\right)\,\text{Cos}[c+d\,x]^5\,\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(80\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)+$$
$$\left(\left(600\,a^3\,b^2+200\,a^2\,b^3-375\,a\,b^4-31\,b^5\right)\,\text{Cos}[c+d\,x]^5\,\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(240\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)+$$
$$\left(b^5\,\text{Cos}[c+d\,x]^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(20\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)-$$
$$\left(b^5\,\text{Cos}[c+d\,x]^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(20\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)+$$
$$\left(\left(-25\,a\,b^4+2\,b^5\right)\,\text{Cos}[c+d\,x]^5\,\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(80\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)+$$
$$\left(\left(-600\,a^3\,b^2+200\,a^2\,b^3+375\,a\,b^4-31\,b^5\right)\,\text{Cos}[c+d\,x]^5\,\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(240\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)+$$
$$\left(\text{Cos}[c+d\,x]^5\,\left(-600\,a^4\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+1000\,a^2\,b^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-89\,b^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right.$$
$$\left.\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(120\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)+$$
$$\left(\text{Cos}[c+d\,x]^5\,\left(200\,a^2\,b^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-31\,b^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(120\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)+$$
$$\left(\text{Cos}[c+d\,x]^5\,\left(-200\,a^2\,b^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+31\,b^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(120\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)+$$
$$\left(\text{Cos}[c+d\,x]^5\,\left(600\,a^4\,b\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-1000\,a^2\,b^3\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+89\,b^5\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right.$$
$$\left.\left(a+b\,\text{Tan}[c+d\,x]\right)^5\right)\Big/$$
$$\left(120\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^5\right)$$

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

$$\int \text{Sec}[c+d x]^7 \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5 \, dx$$

Optimal (type 3, 30 leaves, 2 steps):

$$\frac{\left(b+a \text{Cot}[c+d x]\right)^6 \text{Tan}[c+d x]^6}{6 b d}$$

Result (type 3, 370 leaves):

$$-\frac{b^3 \left(-5 a^2+b^2\right) \text{Cos}[c+d x] \left(a+b \text{Tan}[c+d x]\right)^5}{2 d \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5}+\frac{b \left(5 a^4-10 a^2 b^2+b^4\right) \text{Cos}[c+d x]^3 \left(a+b \text{Tan}[c+d x]\right)^5}{2 d \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5}+\frac{b^5 \text{Sec}[c+d x] \left(a+b \text{Tan}[c+d x]\right)^5}{6 d \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5}+\frac{a b^4 \text{Sin}[c+d x] \left(a+b \text{Tan}[c+d x]\right)^5}{d \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5}+\left(2 \text{Cos}[c+d x]^2 \left(5 a^3 b^2 \text{Sin}[c+d x]-3 a b^4 \text{Sin}[c+d x]\right) \left(a+b \text{Tan}[c+d x]\right)^5\right) \Big/ \left(3 d \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5\right)+\left(\text{Cos}[c+d x]^4 \left(3 a^5 \text{Sin}[c+d x]-10 a^3 b^2 \text{Sin}[c+d x]+3 a b^4 \text{Sin}[c+d x]\right) \left(a+b \text{Tan}[c+d x]\right)^5\right) \Big/ \left(3 d \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5\right)$$

Problem 105: Result more than twice size of optimal antiderivative.

$$\int \text{Sec}[c+d x]^8 \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5 \, dx$$

Optimal (type 3, 318 leaves, 19 steps):

$$\frac{a^5 \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{5 a^3 b^2 \text{ArcTanh}[\text{Sin}[c+d x]]}{4 d}+\frac{5 a b^4 \text{ArcTanh}[\text{Sin}[c+d x]]}{16 d}+\frac{5 a^4 b \text{Sec}[c+d x]^3}{3 d}-\frac{10 a^2 b^3 \text{Sec}[c+d x]^3}{3 d}+\frac{b^5 \text{Sec}[c+d x]^3}{3 d}+\frac{2 a^2 b^3 \text{Sec}[c+d x]^5}{d}-\frac{2 b^5 \text{Sec}[c+d x]^5}{5 d}+\frac{b^5 \text{Sec}[c+d x]^7}{7 d}+\frac{a^5 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}-\frac{5 a^3 b^2 \text{Sec}[c+d x] \text{Tan}[c+d x]}{4 d}+\frac{5 a b^4 \text{Sec}[c+d x] \text{Tan}[c+d x]}{16 d}+\frac{5 a^3 b^2 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{2 d}-\frac{5 a b^4 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{8 d}+\frac{5 a b^4 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]^3}{6 d}$$

Result (type 3, 1677 leaves):

$$\frac{b \left(1400 a^4-1540 a^2 b^2+103 b^4\right) \text{Cos}[c+d x]^5 \left(a+b \text{Tan}[c+d x]\right)^5}{1680 d \left(a \text{Cos}[c+d x]+b \text{Sin}[c+d x]\right)^5}+$$

$$\left(\left(-8 a^5+20 a^3 b^2-5 a b^4\right) \text{Cos}[c+d x]^5 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right.$$

$$\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/ \left(16\,d\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\right) +$$

$$\Big(\left(8\,a^5 - 20\,a^3\,b^2 + 5\,a\,b^4\right)\,\text{Cos}[c + d\,x]^5\,\text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] + \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big]$$

$$\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/ \left(16\,d\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\right) +$$

$$\Big(\left(35\,a\,b^4 + 3\,b^5\right)\,\text{Cos}[c + d\,x]^5\,\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/$$

$$\Big(336\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] - \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^6\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) +$$

$$\Big(\left(350\,a^3\,b^2 + 140\,a^2\,b^3 - 175\,a\,b^4 - 18\,b^5\right)\,\text{Cos}[c + d\,x]^5\,\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/$$

$$\Big(560\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] - \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^4\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) +$$

$$\Big(\left(840\,a^5 + 1400\,a^4\,b - 2100\,a^3\,b^2 - 1540\,a^2\,b^3 + 525\,a\,b^4 + 103\,b^5\right)\,\text{Cos}[c + d\,x]^5\,\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/$$

$$\Big(3360\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] - \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^2\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) +$$

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

$$\Big(56\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] - \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^7\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) -$$

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

$$\Big(56\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] + \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^7\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) +$$

$$\Big(\left(-35\,a\,b^4 + 3\,b^5\right)\,\text{Cos}[c + d\,x]^5\,\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/$$

$$\Big(336\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] + \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^6\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) +$$

$$\Big(\left(-350\,a^3\,b^2 + 140\,a^2\,b^3 + 175\,a\,b^4 - 18\,b^5\right)\,\text{Cos}[c + d\,x]^5\,\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/$$

$$\Big(560\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] + \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^4\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) +$$

$$\Big(\left(-840\,a^5 + 1400\,a^4\,b + 2100\,a^3\,b^2 - 1540\,a^2\,b^3 - 525\,a\,b^4 + 103\,b^5\right)\,\text{Cos}[c + d\,x]^5\,\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/$$

$$\Big(3360\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] + \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^2\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) +$$

$$\Big(\text{Cos}[c + d\,x]^5\,\Big(-1400\,a^4\,b\,\text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big] + 1540\,a^2\,b^3\,\text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big] - 103\,b^5\,\text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)$$

$$\left(a + b\,\text{Tan}[c + d\,x]\right)^5\Big) \Big/$$

$$\Big(1680\,d\,\Big(\text{Cos}\Big[\frac{1}{2}\,(c + d\,x)\Big] + \text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)^3\,\left(a\,\text{Cos}[c + d\,x] + b\,\text{Sin}[c + d\,x]\right)^5\Big) +$$

$$\Big(\text{Cos}[c + d\,x]^5\,\Big(-1400\,a^4\,b\,\text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big] + 1540\,a^2\,b^3\,\text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big] - 103\,b^5\,\text{Sin}\Big[\frac{1}{2}\,(c + d\,x)\Big]\Big)$$

$$\left.(a+b\,\mathrm{Tan}[c+d\,x])^5\right)\Big/$$
$$\left(1680\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^5\right)+$$
$$\left(\mathrm{Cos}[c+d\,x]^5\left(70\,a^2\,b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]-9\,b^5\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\mathrm{Tan}[c+d\,x])^5\right)\Big/$$
$$\left(140\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^5(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^5\right)+$$
$$\left(\mathrm{Cos}[c+d\,x]^5\left(-70\,a^2\,b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+9\,b^5\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a+b\,\mathrm{Tan}[c+d\,x])^5\right)\Big/$$
$$\left(140\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^5(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^5\right)+$$
$$\left(\mathrm{Cos}[c+d\,x]^5\left(1400\,a^4\,b\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]-1540\,a^2\,b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+103\,b^5\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right.$$
$$\left.(a+b\,\mathrm{Tan}[c+d\,x])^5\right)\Big/$$
$$\left(1680\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^3(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^5\right)+$$
$$\left(\mathrm{Cos}[c+d\,x]^5\left(1400\,a^4\,b\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]-1540\,a^2\,b^3\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+103\,b^5\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right.$$
$$\left.(a+b\,\mathrm{Tan}[c+d\,x])^5\right)\Big/$$
$$\left(1680\,d\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^5\right)$$

Problem 112: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 119 leaves, 5 steps):

$$\frac{a\,b^2\,x}{(a^2+b^2)^2}+\frac{a\,x}{2\,(a^2+b^2)}+\frac{b\,\mathrm{Cos}[c+d\,x]^2}{2\,(a^2+b^2)\,d}+$$
$$\frac{b^3\,\mathrm{Log}[a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x]]}{(a^2+b^2)^2\,d}+\frac{a\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{2\,(a^2+b^2)\,d}$$

Result (type 3, 143 leaves):

$$\frac{1}{4\,(a^2+b^2)^2\,d}\left(2\,a^3\,c+6\,a\,b^2\,c+4\,i\,b^3\,c+2\,a^3\,d\,x+6\,a\,b^2\,d\,x+\right.$$
$$4\,i\,b^3\,d\,x-4\,i\,b^3\,\mathrm{ArcTan}[\mathrm{Tan}[c+d\,x]]+b\,(a^2+b^2)\,\mathrm{Cos}[2\,(c+d\,x)]+$$
$$\left.2\,b^3\,\mathrm{Log}\left[(a\,\mathrm{Cos}[c+d\,x]+b\,\mathrm{Sin}[c+d\,x])^2\right]+a^3\,\mathrm{Sin}[2\,(c+d\,x)]+a\,b^2\,\mathrm{Sin}[2\,(c+d\,x)]\right)$$

Problem 119: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 153 leaves, 7 steps):

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

Result (type 3, 321 leaves):

$$\frac{1}{24 b^4 d}\left(48 \left(a^2+b^2\right)^{3/2} \text{ArcTanh}\left[\frac{-b+a \text{Tan}\left[\frac{1}{2} (c+d x)\right]}{\sqrt{a^2+b^2}}\right]+\text{Sec}[c+d x]^3 \left(12 a^2 b+20 b^3+12 b \left(a^2+b^2\right) \text{Cos}[2 (c+d x)]+6 a^3 \text{Cos}[3 (c+d x)] \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+9 a b^2 \text{Cos}[3 (c+d x)] \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+9 a \left(2 a^2+3 b^2\right) \text{Cos}[c+d x] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)-6 a^3 \text{Cos}[3 (c+d x)] \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-9 a b^2 \text{Cos}[3 (c+d x)] \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-6 a b^2 \text{Sin}[2 (c+d x)]\right)\right)$$

Problem 121: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^6}{a \text{Cos}[c+d x]+b \text{Sin}[c+d x]} \, dx$$

Optimal (type 3, 262 leaves, 11 steps):

$$-\frac{3\,a\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,b^2\,d}-\frac{a\,\left(a^2+b^2\right)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,b^4\,d}-\frac{a\,\left(a^2+b^2\right)^2\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{b^6\,d}-\frac{\left(a^2+b^2\right)^{5/2}\,\text{ArcTanh}\left[\frac{b\,\text{Cos}[c+d\,x]-a\,\text{Sin}[c+d\,x]}{\sqrt{a^2+b^2}}\right]}{b^6\,d}+\frac{\left(a^2+b^2\right)^2\,\text{Sec}[c+d\,x]}{b^5\,d}+\frac{\left(a^2+b^2\right)\,\text{Sec}[c+d\,x]^3}{3\,b^3\,d}+\frac{\text{Sec}[c+d\,x]^5}{5\,b\,d}-\frac{3\,a\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,b^2\,d}-\frac{a\,\left(a^2+b^2\right)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,b^4\,d}-\frac{a\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,b^2\,d}$$

Result (type 3, 1313 leaves):

$$\left(\left(120\,a^4+260\,a^2\,b^2+149\,b^4\right)\,\text{Sec}[c+d\,x]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(120\,b^5\,d\,\left(a+b\,\text{Tan}[c+d\,x]\right)\right)+$$

$$\left(2\,\left(a-\mathrm{i}\,b\right)^2\,\left(a+\mathrm{i}\,b\right)^2\,\sqrt{a^2+b^2}\,\text{ArcTanh}\left[\frac{\sqrt{a^2+b^2}\,\left(-b\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+a\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}{a^2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+b^2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]}\right]\,\text{Sec}[c+d\,x]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(b^6\,d\,\left(a+b\,\text{Tan}[c+d\,x]\right)\right)+$$

$$\left(\left(8\,a^5+20\,a^3\,b^2+15\,a\,b^4\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}[c+d\,x]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(8\,b^6\,d\,\left(a+b\,\text{Tan}[c+d\,x]\right)\right)+$$

$$\left(\left(-8\,a^5-20\,a^3\,b^2-15\,a\,b^4\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Sec}[c+d\,x]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(8\,b^6\,d\,\left(a+b\,\text{Tan}[c+d\,x]\right)\right)+$$

$$\frac{(-5\,a+2\,b)\,\text{Sec}[c+d\,x]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)}{80\,b^2\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4\,\left(a+b\,\text{Tan}[c+d\,x]\right)}+$$

$$\left(\left(-60\,a^3+20\,a^2\,b-105\,a\,b^2+29\,b^3\right)\,\text{Sec}[c+d\,x]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)\right)\Big/\left(240\,b^4\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2\,\left(a+b\,\text{Tan}[c+d\,x]\right)\right)+$$

$$\frac{\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)}{20\,b\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5\,\left(a+b\,\text{Tan}[c+d\,x]\right)}-\frac{\text{Sec}[c+d\,x]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)}{20\,b\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^5\,\left(a+b\,\text{Tan}[c+d\,x]\right)}+$$

$$\frac{(5\,a+2\,b)\,\text{Sec}[c+d\,x]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)}{80\,b^2\,d\,\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^4\,\left(a+b\,\text{Tan}[c+d\,x]\right)}+$$

$$\left(\left(60\,a^3+20\,a^2\,b+105\,a\,b^2+29\,b^3\right)\,\text{Sec}[c+d\,x]\,\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(240\, b^4\, d \left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2 (a+b\,\text{Tan}[c+d\,x])\right)+$$

$$\left(\text{Sec}[c+d\,x]\left(-20\,a^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-29\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])\right)\Big/$$

$$\left(120\, b^3\, d \left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3 (a+b\,\text{Tan}[c+d\,x])\right)+$$

$$\left(\text{Sec}[c+d\,x]\left(20\,a^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+29\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])\right)\Big/$$

$$\left(120\, b^3\, d \left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^3 (a+b\,\text{Tan}[c+d\,x])\right)+$$

$$\left(\text{Sec}[c+d\,x]\left(-120\,a^4\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-260\,a^2\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-149\,b^4\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right.$$
$$\left.(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])\right)\Big/$$

$$\left(120\, b^5\, d \left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right) (a+b\,\text{Tan}[c+d\,x])\right)+$$

$$\left(\text{Sec}[c+d\,x]\left(120\,a^4\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+260\,a^2\,b^2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+149\,b^4\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right.$$
$$\left.(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])\right)\Big/$$

$$\left(120\, b^5\, d \left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right) (a+b\,\text{Tan}[c+d\,x])\right)$$

Problem 124: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 82 leaves, 4 steps):

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

Result (type 3, 192 leaves):

$$\left(a^2\,\text{Cos}[c+d\,x]\left((a+i\,b)^2\,(c+d\,x)+a\,b\,\text{Log}\left[(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^2\right]\right)+\right.$$
$$b\left((a+i\,b)\left(-i\,b^2+a\,b\,(1+i\,c+i\,d\,x)+a^2\,(c+d\,x)\right)+\right.$$
$$\left.a^2\,b\,\text{Log}\left[(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])^2\right]\right)\text{Sin}[c+d\,x]-$$
$$\left.2\,i\,a^2\,b\,\text{ArcTan}[\text{Tan}[c+d\,x]]\,(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])\right)\Big/$$
$$\left(a\left(a^2+b^2\right)^2 d\,(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x])\right)$$

Problem 129: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 179 leaves, 11 steps):

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

Result (type 3, 709 leaves):

$$-\frac{(a-i b)(a+i b)\operatorname{Sec}[c+d x]^2(a\operatorname{Cos}[c+d x]+b\operatorname{Sin}[c+d x])}{b^3 d(a+b\operatorname{Tan}[c+d x])^2}-\frac{2 a\operatorname{Sec}[c+d x]^2(a\operatorname{Cos}[c+d x]+b\operatorname{Sin}[c+d x])^2}{b^3 d(a+b\operatorname{Tan}[c+d x])^2}-$$

$$\left(6 a\sqrt{a^2+b^2}\operatorname{ArcTanh}\left[\frac{\sqrt{a^2+b^2}\left(-b\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+a\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{a^2\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+b^2\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]}\right]\operatorname{Sec}[c+d x]^2(a\operatorname{Cos}[c+d x]+b\operatorname{Sin}[c+d x])^2\right)\Big/\left(b^4 d(a+b\operatorname{Tan}[c+d x])^2\right)-$$

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

$$\left(3\left(2 a^2+b^2\right)\operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\operatorname{Sec}[c+d x]^2(a\operatorname{Cos}[c+d x]+b\operatorname{Sin}[c+d x])^2\right)\Big/\left(2 b^4 d(a+b\operatorname{Tan}[c+d x])^2\right)+$$

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

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

$$\frac{\operatorname{Sec}[c+d x]^2(a\operatorname{Cos}[c+d x]+b\operatorname{Sin}[c+d x])^2}{4 b^2 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2(a+b\operatorname{Tan}[c+d x])^2}+$$

$$\frac{2 a\operatorname{Sec}[c+d x]^2\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right](a\operatorname{Cos}[c+d x]+b\operatorname{Sin}[c+d x])^2}{b^3 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)(a+b\operatorname{Tan}[c+d x])^2}$$

Problem 132: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 122 leaves, 5 steps):

$$\frac{a\left(a^2-3 b^2\right)x}{\left(a^2+b^2\right)^3}+\frac{b\left(3 a^2-b^2\right)\operatorname{Log}[a\operatorname{Cos}[c+d x]+b\operatorname{Sin}[c+d x]]}{\left(a^2+b^2\right)^3 d}-\frac{b}{2\left(a^2+b^2\right)d(a+b\operatorname{Tan}[c+d x])^2}-\frac{2 a b}{\left(a^2+b^2\right)^2 d(a+b\operatorname{Tan}[c+d x])}$$

Result (type 3, 154 leaves):

$$\frac{1}{2 d}\left(\frac{2 a \left(a^2-3 b^2\right) (c+d x)}{\left(a^2+b^2\right)^3}-\frac{2 b \left(-3 a^2+b^2\right) \text{Log}[a \text{Cos}[c+d x]+b \text{Sin}[c+d x]]}{\left(a^2+b^2\right)^3}-\frac{b^3}{(a-i b)^2 (a+i b)^2 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^2}+\frac{6 b^2 \text{Sin}[c+d x]}{\left(a^2+b^2\right)^2 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])}\right)$$

Problem 134: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 22 leaves, 2 steps):

$$-\frac{1}{2 b d (a+b \text{Tan}[c+d x])^2}$$

Result (type 3, 57 leaves):

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

Problem 135: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{1}{(a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^3} \, dx$$

Optimal (type 3, 103 leaves, 3 steps):

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

Result (type 3, 132 leaves):

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

Problem 139: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 383 leaves, 31 steps):

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

$$\frac{8 a^2 \sqrt{a^2+b^2} \text{ArcTanh}\left[\frac{b \text{Cos}[c+d x]-a \text{Sin}[c+d x]}{\sqrt{a^2+b^2}}\right]}{b^6 d}-\frac{\sqrt{a^2+b^2} \text{ArcTanh}\left[\frac{b \text{Cos}[c+d x]-a \text{Sin}[c+d x]}{\sqrt{a^2+b^2}}\right]}{2 b^4 d}-$$

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

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

$$\frac{4 a \left(a^2+b^2\right)}{b^5 d (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])}-\frac{3 a \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 b^4 d}$$

Result (type 3, 688 leaves) :

$$\frac{1}{12\, b^6\, d\, (a + b\, \text{Tan}[c + d\, x])^3} \text{Sec}[c + d\, x]^3\, (a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])$$

$$\Bigg(\frac{6\, b^2\, (a^2 + b^2)^2\, \text{Sin}[c + d\, x]}{a} + \frac{6\, (a - i\, b)\, (a + i\, b)\, b\, (8\, a^2 - b^2)\, (a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])}{a} +$$

$$2\, b\, (36\, a^2 + 13\, b^2)\, (a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])^2 +$$

$$60\, \sqrt{a^2 + b^2}\, (4\, a^2 + b^2)\, \text{ArcTanh}\Big[\frac{-b + a\, \text{Tan}[\frac{1}{2}\, (c + d\, x)]}{\sqrt{a^2 + b^2}}\Big]\, (a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])^2 +$$

$$30\, a\, (4\, a^2 + 3\, b^2)\, \text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\, (c + d\, x)\Big] - \text{Sin}\Big[\frac{1}{2}\, (c + d\, x)\Big]\Big]\, (a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])^2 -$$

$$30\, a\, (4\, a^2 + 3\, b^2)\, \text{Log}\Big[\text{Cos}\Big[\frac{1}{2}\, (c + d\, x)\Big] + \text{Sin}\Big[\frac{1}{2}\, (c + d\, x)\Big]\Big]\, (a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])^2 +$$

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

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

$$\Big(2\, b\, (36\, a^2 + 13\, b^2)\, \text{Sin}\Big[\frac{1}{2}\, (c + d\, x)\Big]\, (a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])^2\Big) \Big/$$

$$\Big(\text{Cos}\Big[\frac{1}{2}\, (c + d\, x)\Big] - \text{Sin}\Big[\frac{1}{2}\, (c + d\, x)\Big]\Big) -$$

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

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

$$\Big(2\, b\, (36\, a^2 + 13\, b^2)\, \text{Sin}\Big[\frac{1}{2}\, (c + d\, x)\Big]\, (a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])^2\Big) \Big/$$

$$\Big(\text{Cos}\Big[\frac{1}{2}\, (c + d\, x)\Big] + \text{Sin}\Big[\frac{1}{2}\, (c + d\, x)\Big]\Big)\Bigg)$$

Problem 140: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c + d\, x]^5}{(a\, \text{Cos}[c + d\, x] + b\, \text{Sin}[c + d\, x])^3}\, dx$$

Optimal (type 3, 232 leaves, 3 steps):

$$-\frac{(a^2+b^2)^3}{2 a^2 b^5 d (b+a \text{Cot}[c+d x])^2}-\frac{(5 a^2-b^2)(a^2+b^2)^2}{a^2 b^6 d (b+a \text{Cot}[c+d x])}+\frac{3 (a^2+b^2)(5 a^2+b^2) \text{Log}[b+a \text{Cot}[c+d x]]}{b^7 d}+\frac{3 (a^2+b^2)(5 a^2+b^2) \text{Log}[\text{Tan}[c+d x]]}{b^7 d}-\frac{a (10 a^2+9 b^2) \text{Tan}[c+d x]}{b^6 d}+\frac{3 (2 a^2+b^2) \text{Tan}[c+d x]^2}{2 b^5 d}-\frac{a \text{Tan}[c+d x]^3}{b^4 d}+\frac{\text{Tan}[c+d x]^4}{4 b^3 d}$$

Result (type 3, 530 leaves) :

$$-\frac{(a-i b)^2 (a+i b)^2 \text{Sec}[c+d x]^3 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])}{2 b^5 d (a+b \text{Tan}[c+d x])^3}-\left(3 (5 a^4+6 a^2 b^2+b^4) \text{Log}[\text{Cos}[c+d x]] \text{Sec}[c+d x]^3 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^3\right)/\left(b^7 d (a+b \text{Tan}[c+d x])^3\right)+\left(3 (5 a^4+6 a^2 b^2+b^4) \text{Log}[a \text{Cos}[c+d x]+b \text{Sin}[c+d x]] \text{Sec}[c+d x]^3 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^3\right)/\left(b^7 d (a+b \text{Tan}[c+d x])^3\right)+\frac{(3 a^2+b^2) \text{Sec}[c+d x]^5 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^3}{b^5 d (a+b \text{Tan}[c+d x])^3}+\frac{\text{Sec}[c+d x]^7 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^3}{4 b^3 d (a+b \text{Tan}[c+d x])^3}-\left(2 \text{Sec}[c+d x]^4 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^3 (5 a^3 \text{Sin}[c+d x]+4 a b^2 \text{Sin}[c+d x])\right)/\left(b^6 d (a+b \text{Tan}[c+d x])^3\right)-\left(5 \text{Sec}[c+d x]^3 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^2 (a^4 \text{Sin}[c+d x]+2 a^2 b^2 \text{Sin}[c+d x]+b^4 \text{Sin}[c+d x])\right)/\left(b^6 d (a+b \text{Tan}[c+d x])^3\right)-\frac{a \text{Sec}[c+d x]^5 (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^3 \text{Tan}[c+d x]}{b^4 d (a+b \text{Tan}[c+d x])^3}$$

Problem 141: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 165 leaves, 6 steps) :

$$\frac{(a^4-6 a^2 b^2+b^4) x}{(a^2+b^2)^4}+\frac{4 a b (a^2-b^2) \text{Log}[a \text{Cos}[c+d x]+b \text{Sin}[c+d x]]}{(a^2+b^2)^4 d}-\frac{b}{3 (a^2+b^2) d (a+b \text{Tan}[c+d x])^3}-\frac{a b}{(a^2+b^2)^2 d (a+b \text{Tan}[c+d x])^2}-\frac{b (3 a^2-b^2)}{(a^2+b^2)^3 d (a+b \text{Tan}[c+d x])}$$

Result (type 3, 419 leaves) :

$$\frac{(a^2-2ab-b^2)(a^2+2ab-b^2)(c+dx)}{(a-\mathrm{i}\,b)^4(a+\mathrm{i}\,b)^4 d}+\left(4\left(\mathrm{i}\,a^{10}b+a^9b^2+2\,\mathrm{i}\,a^8b^3+2a^7b^4-2\,\mathrm{i}\,a^4b^7-2a^3b^8-\mathrm{i}\,a^2b^9-ab^{10}\right)(c+dx)\right)\Big/$$
$$\left((a-\mathrm{i}\,b)^8(a+\mathrm{i}\,b)^7 d\right)-\frac{4\,\mathrm{i}\,(a^3b-ab^3)\,\text{ArcTan}[\text{Tan}[c+dx]]}{(a^2+b^2)^4 d}+$$
$$\frac{2(a^3b-ab^3)\,\text{Log}\left[(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^2\right]}{(a^2+b^2)^4 d}+$$
$$\frac{b^4\,\text{Sin}[c+dx]}{3a(a-\mathrm{i}\,b)^2(a+\mathrm{i}\,b)^2 d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^3}-$$
$$\frac{b^3(6a^2+b^2)}{3a(a-\mathrm{i}\,b)^3(a+\mathrm{i}\,b)^3 d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^2}+$$
$$\frac{2\left(9a^2b^2\,\text{Sin}[c+dx]-2b^4\,\text{Sin}[c+dx]\right)}{3a(a-\mathrm{i}\,b)^3(a+\mathrm{i}\,b)^3 d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])}$$

Problem 143: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 30 leaves, 2 steps):

$$-\frac{\text{Cot}[c+dx]^3}{3bd\,(b+a\,\text{Cot}[c+dx])^3}$$

Result (type 3, 124 leaves):

$$\left(-6ab(a^2+b^2)\,\text{Cos}[c+dx]+(-6a^3b+2ab^3)\,\text{Cos}[3(c+dx)]+\right.$$
$$\left.2(a^2-b^2)\left(3a^2+b^2+(3a^2-b^2)\,\text{Cos}[2(c+dx)]\right)\text{Sin}[c+dx]\right)\Big/$$
$$\left(12a(a^2+b^2)^2 d\,(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^3\right)$$

Problem 146: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+dx]}{(a\,\text{Cos}[c+dx]+b\,\text{Sin}[c+dx])^4}\,dx$$

Optimal (type 3, 231 leaves, 8 steps):

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

Result (type 3, 478 leaves):

$$-\frac{\text{Sec}[c+d x]^4\left(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x]\right)}{3 b d\left(a+b\,\text{Tan}[c+d x]\right)^4}+$$
$$\frac{\left(-2 a^2-b^2\right)\text{Sec}[c+d x]^4\left(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x]\right)^3}{2 b^3\left(-\mathbb{i} a+b\right)\left(\mathbb{i} a+b\right) d\left(a+b\,\text{Tan}[c+d x]\right)^4}-$$
$$\left(a\sqrt{a^2+b^2}\left(2 a^2+3 b^2\right)\text{ArcTanh}\left[\frac{\sqrt{a^2+b^2}\left(-b\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]+a\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}{a^2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]+b^2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]}\right]\right.$$
$$\left.\text{Sec}[c+d x]^4\left(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x]\right)^4\right)\Big/\left(\left(a^4 b^4+2 a^2 b^6+b^8\right) d\left(a+b\,\text{Tan}[c+d x]\right)^4\right)-$$
$$\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}[c+d x]^4\left(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x]\right)^4\right)\Big/$$
$$\left(b^4 d\left(a+b\,\text{Tan}[c+d x]\right)^4\right)+$$
$$\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\text{Sec}[c+d x]^4\left(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x]\right)^4\right)\Big/$$
$$\left(b^4 d\left(a+b\,\text{Tan}[c+d x]\right)^4\right)-\frac{\text{Sec}[c+d x]^3\left(a\,\text{Cos}[c+d x]+b\,\text{Sin}[c+d x]\right)^2\text{Tan}[c+d x]}{2 b^2 d\left(a+b\,\text{Tan}[c+d x]\right)^4}$$

Problem 169: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 46 leaves, 8 steps):

$$-\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}+\frac{2\,\mathbb{i}\,\text{Cos}[c+d x]}{a^2 d}+\frac{2\,\text{Sin}[c+d x]}{a^2 d}$$

Result (type 3, 184 leaves):

$$-\left(\left(\text{Sec}[c+d x]^2 \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(2 i+\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+\left(2+i\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-i\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\left(\text{Cos}\left[\frac{3}{2}(c+d x)\right]+i\,\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)\right)\Big/\left(a^2 d\left(-i+\text{Tan}[c+d x]\right)^2\right)\right)$$

Problem 171: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 56 leaves, 8 steps):

$$\frac{3\,\text{ArcTanh}[\text{Sin}[c+d x]]}{2 a^2 d}-\frac{2 i\,\text{Sec}[c+d x]}{a^2 d}-\frac{\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{2 a^2 d}$$

Result (type 3, 146 leaves):

$$-\frac{1}{4 a^2 d}\text{Sec}[c+d x]^2\left(8 i\,\text{Cos}[c+d x]+3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+3\,\text{Cos}[2(c+d x)]\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)-3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+2\,\text{Sin}[c+d x]\right)$$

Problem 173: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^5}{(a\,\text{Cos}[c+d x]+i\,a\,\text{Sin}[c+d x])^2}\,dx$$

Optimal (type 3, 84 leaves, 10 steps):

$$\frac{5\,\text{ArcTanh}[\text{Sin}[c+d x]]}{8 a^2 d}-\frac{2 i\,\text{Sec}[c+d x]^3}{3 a^2 d}+\frac{5\,\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{8 a^2 d}-\frac{\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{4 a^2 d}$$

Result (type 3, 215 leaves):

$$-\frac{1}{192 a^2 d}\text{Sec}[c+d x]^4 \left(128 i \text{Cos}[c+d x]+45 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+60 \text{Cos}[2(c+d x)] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)+15 \text{Cos}[4(c+d x)] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)-45 \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+18 \text{Sin}[c+d x]-30 \text{Sin}[3(c+d x)]\right)$$

Problem 179: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 32 leaves, 2 steps):

$$\frac{i \text{Cot}[c+d x]^2}{2 a^3 d (i+\text{Cot}[c+d x])^2}$$

Result (type 3, 77 leaves):

$$\frac{i \text{Cos}[2(c+d x)]}{4 a^3 d}+\frac{i \text{Cos}[4(c+d x)]}{8 a^3 d}+\frac{\text{Sin}[2(c+d x)]}{4 a^3 d}+\frac{\text{Sin}[4(c+d x)]}{8 a^3 d}$$

Problem 185: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[c+d x]^5}{(a \text{Cos}[c+d x]+i a \text{Sin}[c+d x])^3} dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$\frac{i (i-\text{Cot}[c+d x])^4 \text{Tan}[c+d x]^4}{4 a^3 d}$$

Result (type 3, 90 leaves):

$$-\frac{1}{4 a^3 d} i \text{Sec}[c] \text{Sec}[c+d x]^4 (3 \text{Cos}[c]+2 \text{Cos}[c+2 d x]+2 \text{Cos}[3 c+2 d x]-3 i \text{Sin}[c]+2 i \text{Sin}[c+2 d x]-2 i \text{Sin}[3 c+2 d x]+i \text{Sin}[3 c+4 d x])$$

Problem 188: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\text{Sec}[x]+\text{Tan}[x]} dx$$

Optimal (type 3, 5 leaves, 3 steps):

$\text{Log}[1+\text{Sin}[x]]$

Result (type 3, 16 leaves):

$$2\,\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right]$$

Problem 191: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[x]}{\text{Sec}[x]+\text{Tan}[x]}\,dx$$

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

$$x+\frac{\text{Cos}[x]}{1+\text{Sin}[x]}$$

Result (type 3, 25 leaves):

$$x-\frac{2\,\text{Sin}\left[\frac{x}{2}\right]}{\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]}$$

Problem 192: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[x]}{\text{Sec}[x]+\text{Tan}[x]}\,dx$$

Optimal (type 3, 9 leaves, 4 steps):

$$-x-\text{ArcTanh}[\text{Cos}[x]]$$

Result (type 3, 20 leaves):

$$-x-\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]+\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]$$

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

$$\int \frac{\text{Sec}[x]}{\text{Sec}[x]+\text{Tan}[x]}\,dx$$

Optimal (type 3, 10 leaves, 2 steps):

$$-\frac{\text{Cos}[x]}{1+\text{Sin}[x]}$$

Result (type 3, 23 leaves):

$$\frac{2\,\text{Sin}\left[\frac{x}{2}\right]}{\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]}$$

Problem 199: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[x]}{\text{Sec}[x]-\text{Tan}[x]}\,dx$$

Optimal (type 3, 7 leaves, 4 steps):

$$x-\text{ArcTanh}[\text{Cos}[x]]$$

Result (type 3, 18 leaves):

$$x-\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]\right]+\text{Log}\left[\text{Sin}\left[\frac{x}{2}\right]\right]$$

Problem 200: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sec}[x]}{\text{Sec}[x]-\text{Tan}[x]}\,dx$$

Optimal (type 3, 11 leaves, 2 steps):

$$\frac{\text{Cos}[x]}{1-\text{Sin}[x]}$$

Result (type 3, 25 leaves):

$$\frac{2\,\text{Sin}\left[\frac{x}{2}\right]}{\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]}$$

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

$$\int \frac{\text{Sin}[x]}{\text{Cot}[x]+\text{Csc}[x]}\,dx$$

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

$$x-\text{Sin}[x]$$

Result (type 3, 14 leaves):

$$2\left(\frac{x}{2}-\frac{\text{Sin}[x]}{2}\right)$$

Problem 205: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[x]}{\text{Cot}[x]+\text{Csc}[x]}\,dx$$

Optimal (type 3, 7 leaves, 4 steps):

$$-x+\text{ArcTanh}[\text{Sin}[x]]$$

Result (type 3, 36 leaves):

$$-x-\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]\right]+\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right]$$

Problem 209: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sin}[x]}{-\text{Cot}[x]+\text{Csc}[x]}\,dx$$

Optimal (type 3, 4 leaves, 3 steps):

$$x+\text{Sin}[x]$$

Result (type 3, 14 leaves):

$$2\left(\frac{x}{2}+\frac{\text{Sin}[x]}{2}\right)$$

Problem 211: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[x]}{-\text{Cot}[x]+\text{Csc}[x]}\,dx$$

Optimal (type 3, 5 leaves, 4 steps):

$$x+\text{ArcTanh}[\text{Sin}[x]]$$

Result (type 3, 46 leaves):

$$2\left(\frac{x}{2}-\frac{1}{2}\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]-\text{Sin}\left[\frac{x}{2}\right]\right]+\frac{1}{2}\text{Log}\left[\text{Cos}\left[\frac{x}{2}\right]+\text{Sin}\left[\frac{x}{2}\right]\right]\right)$$

Problem 215: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{1}{\text{Csc}[c+d\,x]+\text{Sin}[c+d\,x]}\,dx$$

Optimal (type 3, 23 leaves, 3 steps):

$$-\frac{\text{ArcTanh}\left[\frac{\text{Cos}[c+d\,x]}{\sqrt{2}}\right]}{\sqrt{2}\,d}$$

Result (type 3, 61 leaves):

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

Problem 218: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d\,x]}{\text{Csc}[c+d\,x]+\text{Sin}[c+d\,x]}\,dx$$

Optimal (type 3, 29 leaves, 4 steps):

$$-\frac{\text{ArcTan}[\text{Sin}[c+d x]]}{2 d}+\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}$$

Result (type 3, 63 leaves):

$$-\frac{1}{2 d}\left(\text{ArcTan}[\text{Sin}[c+d x]]+\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]\right)$$

Problem 225: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Tan}[c+d x]}{\text{Csc}[c+d x]-\text{Sin}[c+d x]} \, dx$$

Optimal (type 3, 34 leaves, 3 steps):

$$-\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{\text{Sec}[c+d x] \, \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 69 leaves):

$$\frac{1}{2 d}\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+\text{Sec}[c+d x] \, \text{Tan}[c+d x]\right)$$

Problem 226: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Cot}[c+d x]}{\text{Csc}[c+d x]-\text{Sin}[c+d x]} \, dx$$

Optimal (type 3, 11 leaves, 2 steps):

$$\frac{\text{ArcTanh}[\text{Sin}[c+d x]]}{d}$$

Result (type 3, 68 leaves):

$$-\frac{\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}+\frac{\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d}$$

Problem 240: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 90 leaves, 7 steps):

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

Result (type 3, 265 leaves):

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

Problem 241: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 99 leaves, 7 steps):

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

Result (type 3, 201 leaves):

$$\frac{1}{12\,d}\text{Sec}[c+d\,x]^3\left(-9\,a\,\text{Cos}[c+d\,x]\left(a\,(c+d\,x)-b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)-3\,a\,\text{Cos}[3\,(c+d\,x)]\left(a\,(c+d\,x)-b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+b\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]\right)+2\left(3\,a^2+b^2+6\,a\,b\,\text{Cos}[c+d\,x]+\left(3\,a^2-b^2\right)\text{Cos}[2\,(c+d\,x)]\right)\text{Sin}[c+d\,x]\right)$$

Problem 242: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 125 leaves, 9 steps):

$$-\frac{\left(4 a^2+b^2\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{8 d}-\frac{2 a b \text{Tan}[c+d x]}{3 d}+\frac{\left(2 a^2-b^2\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{8 d}+\frac{a b \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{6 d}+\frac{(b+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^3 \text{Tan}[c+d x]}{4 d}$$

Result (type 3, 336 leaves):

$$\frac{1}{192 d} \text{Sec}[c+d x]^4 \left(36 a^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+9 b^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+12 \left(4 a^2+b^2\right) \text{Cos}[2 (c+d x)] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)+3 \left(4 a^2+b^2\right) \text{Cos}[4 (c+d x)] \left(\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]\right)-36 a^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]-9 b^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+24 a^2 \text{Sin}[c+d x]+42 b^2 \text{Sin}[c+d x]+32 a b \text{Sin}[2 (c+d x)]+24 a^2 \text{Sin}[3 (c+d x)]-6 b^2 \text{Sin}[3 (c+d x)]-16 a b \text{Sin}[4 (c+d x)]\right)$$

Problem 264: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 248 leaves, 6 steps):

$$\frac{b^6}{2 a^3 \left(a^2-b^2\right)^2 d (b+a \text{Cos}[c+d x])^2}-\frac{2 b^5 \left(3 a^2-b^2\right)}{a^3 \left(a^2-b^2\right)^3 d (b+a \text{Cos}[c+d x])}-\frac{\left(a \left(a^2+3 b^2\right)-b \left(3 a^2+b^2\right) \text{Cos}[c+d x]\right) \text{Csc}[c+d x]^2}{2 \left(a^2-b^2\right)^3 d}-\frac{(2 a+5 b) \text{Log}[1-\text{Cos}[c+d x]]}{4 (a+b)^4 d}-\frac{(2 a-5 b) \text{Log}[1+\text{Cos}[c+d x]]}{4 (a-b)^4 d}-\frac{b^4 \left(15 a^4-4 a^2 b^2+b^4\right) \text{Log}[b+a \text{Cos}[c+d x]]}{a^3 \left(a^2-b^2\right)^4 d}$$

Result (type 3, 713 leaves):

$$\frac{b^6 \left(b + a \operatorname{Cos}[c + d x]\right) \operatorname{Tan}[c + d x]^3}{2 a^3 (-a + b)^2 (a + b)^2 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3} - \frac{2 b^5 \left(-3 a^2 + b^2\right) \left(b + a \operatorname{Cos}[c + d x]\right)^2 \operatorname{Tan}[c + d x]^3}{a^3 (-a + b)^3 (a + b)^3 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3} - \frac{2 i \left(a^5 - 4 a^3 b^2 - 9 a b^4\right) (c + d x) \left(b + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Tan}[c + d x]^3}{(a - b)^4 (a + b)^4 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3} - \frac{i (-2 a - 5 b) \operatorname{ArcTan}[\operatorname{Tan}[c + d x]] \left(b + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Tan}[c + d x]^3}{2 (a + b)^4 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3} - \frac{i (-2 a + 5 b) \operatorname{ArcTan}[\operatorname{Tan}[c + d x]] \left(b + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Tan}[c + d x]^3}{2 (-a + b)^4 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3} - \frac{\left(b + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Csc}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Tan}[c + d x]^3}{8 (a + b)^3 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3} + \left((-2 a + 5 b) \left(b + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^2\right] \operatorname{Tan}[c + d x]^3\right) \Big/ \left(4 (-a + b)^4 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3\right) + \left(\left(-15 a^4 b^4 + 4 a^2 b^6 - b^8\right) \left(b + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Log}[b + a \operatorname{Cos}[c + d x]] \operatorname{Tan}[c + d x]^3\right) \Big/ \left(a^3 \left(-a^2 + b^2\right)^4 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3\right) + \left((-2 a - 5 b) \left(b + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Log}\left[\operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]^2\right] \operatorname{Tan}[c + d x]^3\right) \Big/ \left(4 (a + b)^4 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3\right) + \frac{\left(b + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \operatorname{Tan}[c + d x]^3}{8 (-a + b)^3 d \left(a \operatorname{Sin}[c + d x] + b \operatorname{Tan}[c + d x]\right)^3}$$

Problem 265: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 232 leaves, 6 steps):

$$-\frac{b^5}{2 a^2 \left(a^2 - b^2\right)^2 d \left(b + a \operatorname{Cos}[c + d x]\right)^2} + \frac{b^4 \left(5 a^2 - b^2\right)}{a^2 \left(a^2 - b^2\right)^3 d \left(b + a \operatorname{Cos}[c + d x]\right)} + \frac{\left(b \left(3 a^2 + b^2\right) - a \left(a^2 + 3 b^2\right) \operatorname{Cos}[c + d x]\right) \operatorname{Csc}[c + d x]^2}{2 \left(a^2 - b^2\right)^3 d} - \frac{(a + 4 b) \operatorname{Log}[1 - \operatorname{Cos}[c + d x]]}{4 (a + b)^4 d} + \frac{(a - 4 b) \operatorname{Log}[1 + \operatorname{Cos}[c + d x]]}{4 (a - b)^4 d} + \frac{2 b^3 \left(5 a^2 + b^2\right) \operatorname{Log}[b + a \operatorname{Cos}[c + d x]]}{\left(a^2 - b^2\right)^4 d}$$

Result (type 3, 477 leaves):

$$-\frac{b^5\,(b+a\,\mathrm{Cos}[c+d\,x])\,\mathrm{Tan}[c+d\,x]^3}{2\,a^2\,(-a+b)^2\,(a+b)^2\,d\,(a\,\mathrm{Sin}[c+d\,x]+b\,\mathrm{Tan}[c+d\,x])^3}+\frac{b^4\,(-5\,a^2+b^2)\,(b+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Tan}[c+d\,x]^3}{a^2\,(-a+b)^3\,(a+b)^3\,d\,(a\,\mathrm{Sin}[c+d\,x]+b\,\mathrm{Tan}[c+d\,x])^3}-\frac{(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}[c+d\,x]^3}{8\,(a+b)^3\,d\,(a\,\mathrm{Sin}[c+d\,x]+b\,\mathrm{Tan}[c+d\,x])^3}+\frac{(a-4\,b)\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\mathrm{Tan}[c+d\,x]^3}{2\,(-a+b)^4\,d\,(a\,\mathrm{Sin}[c+d\,x]+b\,\mathrm{Tan}[c+d\,x])^3}+\left(2\,(5\,a^2\,b^3+b^5)\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]\,\mathrm{Tan}[c+d\,x]^3\right)\Big/\left((-a^2+b^2)^4\,d\,(a\,\mathrm{Sin}[c+d\,x]+b\,\mathrm{Tan}[c+d\,x])^3\right)+\frac{(-a-4\,b)\,(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Log}\left[\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\mathrm{Tan}[c+d\,x]^3}{2\,(a+b)^4\,d\,(a\,\mathrm{Sin}[c+d\,x]+b\,\mathrm{Tan}[c+d\,x])^3}-\frac{(b+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Tan}[c+d\,x]^3}{8\,(-a+b)^3\,d\,(a\,\mathrm{Sin}[c+d\,x]+b\,\mathrm{Tan}[c+d\,x])^3}$$

Problem 266: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 211 leaves, 6 steps):

$$\frac{b^4}{2\,a\,(a^2-b^2)^2\,d\,(b+a\,\mathrm{Cos}[c+d\,x])^2}-\frac{4\,a\,b^3}{(a^2-b^2)^3\,d\,(b+a\,\mathrm{Cos}[c+d\,x])}-\frac{(a\,(a^2+3\,b^2)-b\,(3\,a^2+b^2)\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}[c+d\,x]^2}{2\,(a^2-b^2)^3\,d}-\frac{3\,b\,\mathrm{Log}[1-\mathrm{Cos}[c+d\,x]]}{4\,(a+b)^4\,d}+\frac{3\,b\,\mathrm{Log}[1+\mathrm{Cos}[c+d\,x]]}{4\,(a-b)^4\,d}-\frac{6\,a\,b^2\,(a^2+b^2)\,\mathrm{Log}[b+a\,\mathrm{Cos}[c+d\,x]]}{(a^2-b^2)^4\,d}$$

Result (type 3, 458 leaves):

$$\frac{b^4\,(b+a\,\text{Cos}[c+d\,x])\,\text{Tan}[c+d\,x]^3}{2\,a\,(-a+b)^2\,(a+b)^2\,d\,(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x])^3}+\frac{4\,a\,b^3\,(b+a\,\text{Cos}[c+d\,x])^2\,\text{Tan}[c+d\,x]^3}{(-a+b)^3\,(a+b)^3\,d\,(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x])^3}-$$
$$\frac{(b+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}[c+d\,x]^3}{8\,(a+b)^3\,d\,(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x])^3}+\frac{3\,b\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Tan}[c+d\,x]^3}{2\,(-a+b)^4\,d\,(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x])^3}-$$
$$\left(6\,(a^3\,b^2+a\,b^4)\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Log}[b+a\,\text{Cos}[c+d\,x]]\,\text{Tan}[c+d\,x]^3\right)\Big/\left((-a^2+b^2)^4\,d\,(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x])^3\right)-$$
$$\frac{3\,b\,(b+a\,\text{Cos}[c+d\,x])^3\,\text{Log}\left[\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\,\text{Tan}[c+d\,x]^3}{2\,(a+b)^4\,d\,(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x])^3}+\frac{(b+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\text{Tan}[c+d\,x]^3}{8\,(-a+b)^3\,d\,(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x])^3}$$

Problem 267: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{1}{(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x])^3}\,dx$$

Optimal (type 3, 229 leaves, 5 steps):

$$-\frac{b^3}{2\,(a^2-b^2)^2\,d\,(b+a\,\text{Cos}[c+d\,x])^2}+\frac{b^2\,(3\,a^2+b^2)}{(a^2-b^2)^3\,d\,(b+a\,\text{Cos}[c+d\,x])}+$$
$$\frac{(b\,(3\,a^2+b^2)-a\,(a^2+3\,b^2)\,\text{Cos}[c+d\,x])\,\text{Csc}[c+d\,x]^2}{2\,(a^2-b^2)^3\,d}+\frac{(a-2\,b)\,\text{Log}[1-\text{Cos}[c+d\,x]]}{4\,(a+b)^4\,d}-$$
$$\frac{(a+2\,b)\,\text{Log}[1+\text{Cos}[c+d\,x]]}{4\,(a-b)^4\,d}+\frac{b\,(3\,a^4+8\,a^2\,b^2+b^4)\,\text{Log}[b+a\,\text{Cos}[c+d\,x]]}{(a^2-b^2)^4\,d}$$

Result (type 3, 696 leaves):

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

$$\frac{2 i \left(3 a^4 b+8 a^2 b^3+b^5\right) (c+d x) \left(b+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Tan}[c+d x]^3}{(a-b)^4 (a+b)^4 d \left(a \operatorname{Sin}[c+d x]+b \operatorname{Tan}[c+d x]\right)^3}-$$

$$\frac{i (-a-2 b) \operatorname{ArcTan}[\operatorname{Tan}[c+d x]] \left(b+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Tan}[c+d x]^3}{2 (-a+b)^4 d \left(a \operatorname{Sin}[c+d x]+b \operatorname{Tan}[c+d x]\right)^3}-$$

$$\frac{i (a-2 b) \operatorname{ArcTan}[\operatorname{Tan}[c+d x]] \left(b+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Tan}[c+d x]^3}{2 (a+b)^4 d \left(a \operatorname{Sin}[c+d x]+b \operatorname{Tan}[c+d x]\right)^3}-$$

$$\frac{\left(b+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2 \operatorname{Tan}[c+d x]^3}{8 (a+b)^3 d \left(a \operatorname{Sin}[c+d x]+b \operatorname{Tan}[c+d x]\right)^3}+$$

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

$$\left(\left(3 a^4 b+8 a^2 b^3+b^5\right) \left(b+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Log}[b+a \operatorname{Cos}[c+d x]] \operatorname{Tan}[c+d x]^3\right) \Big/ \left(\left(-a^2+b^2\right)^4 d \left(a \operatorname{Sin}[c+d x]+b \operatorname{Tan}[c+d x]\right)^3\right)+$$

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

$$\frac{\left(b+a \operatorname{Cos}[c+d x]\right)^3 \operatorname{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \operatorname{Tan}[c+d x]^3}{8 (-a+b)^3 d \left(a \operatorname{Sin}[c+d x]+b \operatorname{Tan}[c+d x]\right)^3}$$

Problem 268: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 231 leaves, 6 steps):

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

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

$$\frac{(2 a+b) \operatorname{Log}[1+\operatorname{Cos}[c+d x]]}{4 (a-b)^4 d}-\frac{a \left(a^4+8 a^2 b^2+3 b^4\right) \operatorname{Log}[b+a \operatorname{Cos}[c+d x]]}{\left(a^2-b^2\right)^4 d}$$

Result (type 3, 703 leaves):

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

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

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

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

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

$$\frac{\left(b+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\,\text{Tan}[c+d\,x]^3}{8\,\left(a+b\right)^3\,d\,\left(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x]\right)^3}+$$

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

$$\left(\left(-a^5-8\,a^3\,b^2-3\,a\,b^4\right)\,\left(b+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Log}[b+a\,\text{Cos}[c+d\,x]]\,\text{Tan}[c+d\,x]^3\right)\Big/$$
$$\left(\left(-a^2+b^2\right)^4\,d\,\left(a\,\text{Sin}[c+d\,x]+b\,\text{Tan}[c+d\,x]\right)^3\right)+$$

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

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

Problem 272: Result more than twice size of optimal antiderivative.

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

Optimal (type 5, 264 leaves, 8 steps):

$$\frac{\left(a^2-2 b^2\right) \text{Cos}[c+d x]^{-1+m} \text{Sin}[c+d x]}{d m (2+m)}-\frac{2 a b \text{Cos}[c+d x]^m \text{Sin}[c+d x]}{d \left(2+3 m+m^2\right)}-\frac{\text{Cos}[c+d x]^{-1+m} (b+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{d (2+m)}-\left(\left(a^2 (1-m)-b^2 (2+m)\right) \text{Cos}[c+d x]^{-1+m} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}(-1+m),\frac{1+m}{2},\text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]\right)\Big/\left(d (1-m) m (2+m) \sqrt{\text{Sin}[c+d x]^2}\right)-\left(2 a b \text{Cos}[c+d x]^m \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{m}{2},\frac{2+m}{2},\text{Cos}[c+d x]^2\right] \text{Sin}[c+d x]\right)\Big/\left(d m (1+m) \sqrt{\text{Sin}[c+d x]^2}\right)$$

Result (type 5, 890 leaves) :

$$-\left(\left(b^2 \text{Cos}[c+d x]^{1+m} \text{Hypergeometric2F1}\left[-\frac{1}{2}, \frac{1}{2}(-1+m), \frac{1+m}{2}, \text{Cos}[c+d x]^2\right] \text{Sin}[c+d x] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(4096 d (-1+m) (b+a \text{Cos}[c+d x])^2 \left(\text{Sin}[c+d x]^2\right)^{3/2}\right)\right) -$$

$$\left(a b \text{Cos}[c+d x]^{2+m} \text{Hypergeometric2F1}\left[-\frac{1}{2}, \frac{m}{2}, \frac{2+m}{2}, \text{Cos}[c+d x]^2\right] \text{Sin}[c+d x] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(2048 d m (b+a \text{Cos}[c+d x])^2 \left(\text{Sin}[c+d x]^2\right)^{3/2}\right) -$$

$$\left(a^2 \text{Cos}[c+d x]^{3+m} \text{Hypergeometric2F1}\left[-\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right] \text{Sin}[c+d x] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(2 d (1+m) (b+a \text{Cos}[c+d x])^2 \left(\text{Sin}[c+d x]^2\right)^{3/2}\right) -$$

$$\left(4095 b^2 \text{Cos}[c+d x]^{1+m} \text{Csc}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), \frac{1+m}{2}, \text{Cos}[c+d x]^2\right] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(4096 d (-1+m) (b+a \text{Cos}[c+d x])^2 \sqrt{\text{Sin}[c+d x]^2}\right) -$$

$$\left(4095 a b \text{Cos}[c+d x]^{2+m} \text{Csc}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{m}{2}, \frac{2+m}{2}, \text{Cos}[c+d x]^2\right] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(2048 d m (b+a \text{Cos}[c+d x])^2 \sqrt{\text{Sin}[c+d x]^2}\right) -$$

$$\left(a^2 \text{Cos}[c+d x]^{3+m} \text{Csc}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(2 d (1+m) (b+a \text{Cos}[c+d x])^2 \sqrt{\text{Sin}[c+d x]^2}\right) +$$

$$\left(4095 b^2 \text{Cos}[c+d x]^{3+m} \text{Csc}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \text{Cos}[c+d x]^2\right] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(4096 d (1+m) (b+a \text{Cos}[c+d x])^2 \sqrt{\text{Sin}[c+d x]^2}\right) +$$

$$\left(4095 a b \text{Cos}[c+d x]^{4+m} \text{Csc}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{2+m}{2}, \frac{4+m}{2}, \text{Cos}[c+d x]^2\right] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(2048 d (2+m) (b+a \text{Cos}[c+d x])^2 \sqrt{\text{Sin}[c+d x]^2}\right) +$$

$$\left(a^2 \text{Cos}[c+d x]^{5+m} \text{Csc}[c+d x] \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3+m}{2}, \frac{5+m}{2}, \text{Cos}[c+d x]^2\right] (a \text{Sin}[c+d x]+b \text{Tan}[c+d x])^2\right) \Big/ \left(2 d (3+m) (b+a \text{Cos}[c+d x])^2 \sqrt{\text{Sin}[c+d x]^2}\right)$$

Problem 276: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 92 leaves, 7 steps):

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

Result (type 3, 153 leaves):

$$-\frac{1}{8\left(a^2+b^2\right)^2}\left(-2 a^3 x-6 i a^2 b x+6 a b^2 x+2 i b^3 x-2 i b\left(-3 a^2+b^2\right) \text{ArcTan}[\text{Tan}[x]]+2 b\left(a^2+b^2\right) \text{Cos}[2 x]-2\left(a^2+b^2\right)(a x+b \text{Log}[a \text{Cos}[x]+b \text{Sin}[x]])-3 a^2 b \text{Log}\left[(a \text{Cos}[x]+b \text{Sin}[x])^2\right]+b^3 \text{Log}\left[(a \text{Cos}[x]+b \text{Sin}[x])^2\right]+2 a^3 \text{Sin}[2 x]+2 a b^2 \text{Sin}[2 x]\right)$$

Problem 278: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 93 leaves, 7 steps):

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

Result (type 3, 82 leaves):

$$\frac{1}{4\left(a^2+b^2\right)^2}\left(4 i a b^2 \text{ArcTan}[\text{Tan}[x]]-a\left(a^2+b^2\right) \text{Cos}[2 x]-2 b\left((a+i b)^2 x+a b \text{Log}\left[(a \text{Cos}[x]+b \text{Sin}[x])^2\right]\right)+b\left(a^2+b^2\right) \text{Sin}[2 x]\right)$$

Problem 280: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 176 leaves, 13 steps):

$$\frac{a^2 b^3 x}{\left(a^2+b^2\right)^3}-\frac{a^2 b x}{2\left(a^2+b^2\right)^2}+\frac{b x}{8\left(a^2+b^2\right)}-\frac{a^3 b^2 \text{Log}[a \text{Cos}[x]+b \text{Sin}[x]]}{\left(a^2+b^2\right)^3}+\frac{a^2 b \text{Cos}[x] \text{Sin}[x]}{2\left(a^2+b^2\right)^2}+\frac{b \text{Cos}[x] \text{Sin}[x]}{8\left(a^2+b^2\right)}-\frac{b \text{Cos}[x]^3 \text{Sin}[x]}{4\left(a^2+b^2\right)}-\frac{a b^2 \text{Sin}[x]^2}{2\left(a^2+b^2\right)^2}+\frac{a \text{Sin}[x]^4}{4\left(a^2+b^2\right)}$$

Result (type 3, 178 leaves):

$$\frac{1}{32\left(a^2+b^2\right)^3}\left(-12 a^4 b x-32 i a^3 b^2 x+24 a^2 b^3 x+4 b^5 x+32 i a^3 b^2 \text{ArcTan}[\text{Tan}[x]]-4 a\left(a^4-b^4\right) \text{Cos}[2 x]+a^5 \text{Cos}[4 x]+2 a^3 b^2 \text{Cos}[4 x]+a b^4 \text{Cos}[4 x]-16 a^3 b^2 \text{Log}\left[(a \text{Cos}[x]+b \text{Sin}[x])^2\right]+8 a^4 b \text{Sin}[2 x]+8 a^2 b^3 \text{Sin}[2 x]-a^4 b \text{Sin}[4 x]-2 a^2 b^3 \text{Sin}[4 x]-b^5 \text{Sin}[4 x]\right)$$

Problem 282: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 175 leaves, 13 steps):

$$\frac{a^3 b^2 x}{\left(a^2+b^2\right)^3} - \frac{a b^2 x}{2 \left(a^2+b^2\right)^2} + \frac{a x}{8 \left(a^2+b^2\right)} - \frac{b\,\text{Cos}[x]^4}{4 \left(a^2+b^2\right)} + \frac{a^2 b^3 \,\text{Log}[a\,\text{Cos}[x] + b\,\text{Sin}[x]]}{\left(a^2+b^2\right)^3} - \frac{a b^2 \,\text{Cos}[x]\,\text{Sin}[x]}{2 \left(a^2+b^2\right)^2} + \frac{a\,\text{Cos}[x]\,\text{Sin}[x]}{8 \left(a^2+b^2\right)} - \frac{a\,\text{Cos}[x]^3\,\text{Sin}[x]}{4 \left(a^2+b^2\right)} - \frac{a^2 b\,\text{Sin}[x]^2}{2 \left(a^2+b^2\right)^2}$$

Result (type 3, 287 leaves):

$$-\frac{1}{32 \left(a^2+b^2\right)^3} \Big(-4 a^5 x + 4 i a^4 b x - 24 a^3 b^2 x - 24 i a^2 b^3 x + 12 a b^4 x + 4 i b^5 x - 4 i b \left(a^4 - 6 a^2 b^2 + b^4\right) \text{ArcTan}[\text{Tan}[x]] + 4 b \left(-a^4 + b^4\right) \text{Cos}[2 x] + a^4 b\,\text{Cos}[4 x] + 2 a^2 b^3 \,\text{Cos}[4 x] + b^5 \,\text{Cos}[4 x] - 4 a^4 b\,\text{Log}[a\,\text{Cos}[x] + b\,\text{Sin}[x]] - 8 a^2 b^3 \,\text{Log}[a\,\text{Cos}[x] + b\,\text{Sin}[x]] - 4 b^5 \,\text{Log}[a\,\text{Cos}[x] + b\,\text{Sin}[x]] + 2 a^4 b\,\text{Log}\left[(a\,\text{Cos}[x] + b\,\text{Sin}[x])^2\right] - 12 a^2 b^3 \,\text{Log}\left[(a\,\text{Cos}[x] + b\,\text{Sin}[x])^2\right] + 2 b^5 \,\text{Log}\left[(a\,\text{Cos}[x] + b\,\text{Sin}[x])^2\right] + 8 a^3 b^2 \,\text{Sin}[2 x] + 8 a b^4 \,\text{Sin}[2 x] + a^5 \,\text{Sin}[4 x] + 2 a^3 b^2 \,\text{Sin}[4 x] + a b^4 \,\text{Sin}[4 x]\Big)$$

Problem 284: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 3, 144 leaves):

$$\Big(a\,\text{Cos}[x] \left(-2 i (a + i b)^2 x + \left(-a^2 + b^2\right) \text{Log}\left[(a\,\text{Cos}[x] + b\,\text{Sin}[x])^2\right]\right) + b \left(2 (a + i b) (a (-1 - i x) + b (i + x)) + \left(-a^2 + b^2\right) \text{Log}\left[(a\,\text{Cos}[x] + b\,\text{Sin}[x])^2\right]\right) \text{Sin}[x] + 2 i \left(a^2 - b^2\right) \text{ArcTan}[\text{Tan}[x]] (a\,\text{Cos}[x] + b\,\text{Sin}[x])\Big) \Big/ \left(2 \left(a^2+b^2\right)^2 (a\,\text{Cos}[x] + b\,\text{Sin}[x])\right)$$

Problem 286: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 129 leaves, 17 steps):

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

Result (type 3, 226 leaves):

$$\frac{1}{4\left(a^2+b^2\right)^3\left(a\,\text{Cos}[x]+b\,\text{Sin}[x]\right)}\Big(4\,\mathbb{i}\,a^2\left(a^2-3b^2\right)\text{ArcTan}[\text{Tan}[x]]\left(a\,\text{Cos}[x]+b\,\text{Sin}[x]\right)+a\,\text{Cos}[x]\Big(\left(a^4-b^4\right)\text{Cos}[2x]+2a\left(2\left(\mathbb{i}\,a-b\right)^3x-a\left(a^2-3b^2\right)\text{Log}\left[\left(a\,\text{Cos}[x]+b\,\text{Sin}[x]\right)^2\right]-b\left(a^2+b^2\right)\text{Sin}[2x]\right)\Big)-b\,\text{Sin}[x]\Big(\left(-a^4+b^4\right)\text{Cos}[2x]+2a\left(2\left(a^3\left(1+\mathbb{i}\,x\right)+a b^2\left(1-3\,\mathbb{i}\,x\right)-3a^2 b x+b^3 x\right)+a\left(a^2-3b^2\right)\text{Log}\left[\left(a\,\text{Cos}[x]+b\,\text{Sin}[x]\right)^2\right]+b\left(a^2+b^2\right)\text{Sin}[2x]\right)\Big)\Big)$$

Problem 290: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 128 leaves, 17 steps):

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

Result (type 3, 221 leaves):

$$\frac{1}{4\left(a^2+b^2\right)^3\left(a\,\text{Cos}[x]+b\,\text{Sin}[x]\right)}\Big(-4\,\mathbb{i}\,b^2\left(-3a^2+b^2\right)\text{ArcTan}[\text{Tan}[x]]\left(a\,\text{Cos}[x]+b\,\text{Sin}[x]\right)-a\,\text{Cos}[x]\Big(\left(a^4-b^4\right)\text{Cos}[2x]+2b\left(2\left(a+\mathbb{i}\,b\right)^3x-b\left(-3a^2+b^2\right)\text{Log}\left[\left(a\,\text{Cos}[x]+b\,\text{Sin}[x]\right)^2\right]-a\left(a^2+b^2\right)\text{Sin}[2x]\right)\Big)+b\,\text{Sin}[x]\Big(\left(-a^4+b^4\right)\text{Cos}[2x]+2b\left(-2\left(a+\mathbb{i}\,b\right)\left(a^2x-b^2\left(\mathbb{i}+x\right)+a\left(b+2\,\mathbb{i}\,b\,x\right)\right)+\left(-3a^2 b+b^3\right)\text{Log}\left[\left(a\,\text{Cos}[x]+b\,\text{Sin}[x]\right)^2\right]+a\left(a^2+b^2\right)\text{Sin}[2x]\right)\Big)\Big)$$

Problem 292: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 210 leaves, 48 steps):

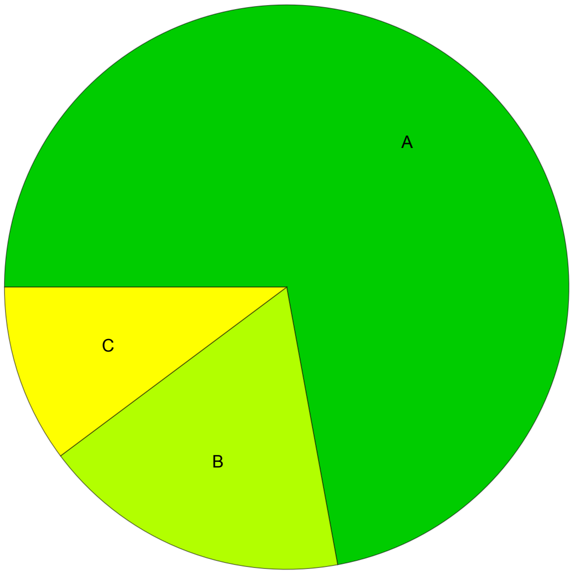
$$-\frac{3 a b \left(a^4-6 a^2 b^2+b^4\right) x}{4 \left(a^2+b^2\right)^4}-\frac{b^2 \operatorname{Cos}[x]^4}{4 \left(a^2+b^2\right)^2}-\frac{3 a^2 b^2 \left(a^2-b^2\right) \operatorname{Log}[a \operatorname{Cos}[x]+b \operatorname{Sin}[x]]}{\left(a^2+b^2\right)^4}+\frac{a b \left(5 a^2-3 b^2\right) \operatorname{Cos}[x] \operatorname{Sin}[x]}{4 \left(a^2+b^2\right)^3}-\frac{a b \operatorname{Cos}[x]^3 \operatorname{Sin}[x]}{2 \left(a^2+b^2\right)^2}-\frac{2 a^2 b^2 \operatorname{Sin}[x]^2}{\left(a^2+b^2\right)^3}+\frac{a^2 \operatorname{Sin}[x]^4}{4 \left(a^2+b^2\right)^2}-\frac{a^2 b^3 \operatorname{Sin}[x]}{\left(a^2+b^2\right)^3 (a \operatorname{Cos}[x]+b \operatorname{Sin}[x])}$$

Result (type 3, 409 leaves):

$$\frac{1}{32 \left(a^2+b^2\right)^4}\left(-12 a b \left(a^2-3 b^2\right) \left(3 a^2-b^2\right) x+6 i \left(a^6-15 a^4 b^2+15 a^2 b^4-b^6\right) x-6 i \left(a^6-15 a^4 b^2+15 a^2 b^4-b^6\right) \operatorname{ArcTan}[\operatorname{Tan}[x]]-4 \left(a^2+b^2\right) \left(a^4-6 a^2 b^2+b^4\right) \operatorname{Cos}[2 x]+\left(a^2-b^2\right) \left(a^2+b^2\right)^2 \operatorname{Cos}[4 x]+3 \left(a^6-15 a^4 b^2+15 a^2 b^4-b^6\right) \operatorname{Log}\left[(a \operatorname{Cos}[x]+b \operatorname{Sin}[x])^2\right]+\frac{2 b \left(a^2+b^2\right) \left(3 a^4-10 a^2 b^2+3 b^4\right) \operatorname{Sin}[x]}{a \operatorname{Cos}[x]+b \operatorname{Sin}[x]}+\left(3 \left(a^2+b^2\right)^2 \left(a \operatorname{Cos}[x] \left(-2 i (a+i b)^2 x+\left(-a^2+b^2\right) \operatorname{Log}\left[(a \operatorname{Cos}[x]+b \operatorname{Sin}[x])^2\right]\right)+b \left(2 (a+i b) (a (-1-i x)+b (i+x))+\left(-a^2+b^2\right) \operatorname{Log}\left[(a \operatorname{Cos}[x]+b \operatorname{Sin}[x])^2\right]\right) \operatorname{Sin}[x]+2 i \left(a^2-b^2\right) \operatorname{ArcTan}[\operatorname{Tan}[x]] (a \operatorname{Cos}[x]+b \operatorname{Sin}[x])\right)\right) \Big/ (a \operatorname{Cos}[x]+b \operatorname{Sin}[x])+16 a b \left(a^4-b^4\right) \operatorname{Sin}[2 x]-2 a b \left(a^2+b^2\right)^2 \operatorname{Sin}[4 x]\right)$$

Summary of Integration Test Results

294 integration problems



A - 212 optimal antiderivatives

B - 52 more than twice size of optimal antiderivatives

C - 30 unnecessarily complex antiderivatives

D - 0 unable to integrate problems

E - 0 integration timeouts