Mathematica 11.3 Integration Test Results

Test results for the 644 problems in "4.2.3.1 (a+b cos)^m (c+d cos)^n (A+B cos).m"

Problem 5: Result more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x]) (A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x] \, dx$$

Optimal (type 3, 32 leaves, 4 steps):

$$a (A + B) x + \frac{a A \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{d} + \frac{a B \operatorname{Sin}[c + d x]}{d}$$

Result (type 3, 104 leaves):

$$a A x + a B x - \frac{a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a B \operatorname{Cos}[d x] \operatorname{Sin}[c]}{d} + \frac{a B \operatorname{Cos}[c] \operatorname{Sin}[d x]}{d}$$

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

$$\int (a + a \operatorname{Cos}[c + d x]) (A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^2 \, dx$$

Optimal (type 3, 32 leaves, 4 steps):

$$a B x + \frac{a (A + B) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{d} + \frac{a A \operatorname{Tan}[c + d x]}{d}$$

Result (type 3, 159 leaves):

$$a B x - \frac{a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} - \frac{a B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a A \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a B \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{a A \operatorname{Tan}[c + d x]}{d}$$

Problem 7: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 56 leaves, 6 steps):

$$\frac{a\,(A+2\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}+\frac{a\,(A+B)\,\text{Tan}[c+d\,x]}{d}+\frac{a\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 154 leaves):

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

Problem 9: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 106 leaves, 7 steps):

$$\frac{a\,(3\,A+4\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{8\,d}+\frac{a\,(A+B)\,\text{Tan}[c+d\,x]}{d}+$$
$$\frac{a\,(3\,A+4\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{8\,d}+\frac{a\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]}{4\,d}+\frac{a\,(A+B)\,\text{Tan}[c+d\,x]^3}{3\,d}$$

Result (type 3, 403 leaves):

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

Problem 16: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 88 leaves, 5 steps):

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

Result (type 3, 277 leaves):

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

Problem 17: Result more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^2\,(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 113 leaves, 7 steps):

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

Result (type 3, 753 leaves):

$$\frac{1}{8d}(-2A-3B)\,(a+a\,\text{Cos}[c+dx])^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4+$$
$$\frac{1}{8d}(2A+3B)\,(a+a\,\text{Cos}[c+dx])^2\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4+$$
$$\frac{A\,(a+a\,\text{Cos}[c+dx])^2\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Sin}\left[\frac{dx}{2}\right]}{24d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$
$$\left((a+a\,\text{Cos}[c+dx])^2\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(7A\,\text{Cos}\left[\frac{c}{2}\right]+3B\,\text{Cos}\left[\frac{c}{2}\right]-5A\,\text{Sin}\left[\frac{c}{2}\right]-3B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(48d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2\right)+$$
$$\frac{(a+a\,\text{Cos}[c+dx])^2\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(5A\,\text{Sin}\left[\frac{dx}{2}\right]+6B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{12d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}+$$
$$\frac{A\,(a+a\,\text{Cos}[c+dx])^2\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Sin}\left[\frac{dx}{2}\right]}{24d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$
$$\left((a+a\,\text{Cos}[c+dx])^2\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(-7A\,\text{Cos}\left[\frac{c}{2}\right]-3B\,\text{Cos}\left[\frac{c}{2}\right]-5A\,\text{Sin}\left[\frac{c}{2}\right]-3B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(48d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2\right)+$$
$$\frac{(a+a\,\text{Cos}[c+dx])^2\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(5A\,\text{Sin}\left[\frac{dx}{2}\right]+6B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{12d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}$$

Problem 23: Result more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+dx])^3\,(A+B\,\text{Cos}[c+dx])\,\text{Sec}[c+dx]^2\,dx$$

Optimal (type 3, 110 leaves, 6 steps):

$$\frac{1}{2}a^3\,(6A+7B)\,x+\frac{a^3\,(3A+B)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{d}+\frac{5a^3\,B\,\text{Sin}[c+dx]}{2d}-$$
$$\frac{(2A-B)\,(a^3+a^3\,\text{Cos}[c+dx])\,\text{Sin}[c+dx]}{2d}+\frac{aA\,(a+a\,\text{Cos}[c+dx])^2\,\text{Tan}[c+dx]}{d}$$

Result (type 3, 272 leaves):

$$\frac{1}{32} a^3 \left(1+\text{Cos}[c+d x]\right)^3 \text{Sec}\left[\frac{1}{2} (c+d x)\right]^6 \left(2 (6 A+7 B) x-\frac{4 (3 A+B) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{4 (3 A+B) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]}{d}+\frac{4 (A+3 B) \text{Cos}[d x] \text{Sin}[c]}{d}+\frac{B \text{Cos}[2 d x] \text{Sin}[2 c]}{d}+\frac{4 (A+3 B) \text{Cos}[c] \text{Sin}[d x]}{d}+\frac{B \text{Cos}[2 c] \text{Sin}[2 d x]}{d}+\frac{4 A \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}+\frac{4 A \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)}\right)$$

Problem 25: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 125 leaves, 6 steps):

$$a^3 B x+\frac{a^3 (5 A+7 B) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}+\frac{5 a^3 (A+B) \text{Tan}[c+d x]}{2 d}+\frac{(5 A+3 B) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sec}[c+d x] \text{Tan}[c+d x]}{6 d}+\frac{a A (a+a \text{Cos}[c+d x])^2 \text{Sec}[c+d x]^2 \text{Tan}[c+d x]}{3 d}$$

Result (type 3, 786 leaves):

$$\frac{1}{8} B x \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 + \frac{1}{16 d}$$
$$(-5 A - 7 B) \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 +$$
$$\frac{1}{16 d} (5 A + 7 B) \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 +$$
$$\frac{A \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \operatorname{Sin}\left[\frac{d x}{2}\right]}{48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^3} +$$
$$\left(\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(10 A \operatorname{Cos}\left[\frac{c}{2}\right] + 3 B \operatorname{Cos}\left[\frac{c}{2}\right] - 8 A \operatorname{Sin}\left[\frac{c}{2}\right] - 3 B \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right) \Big/$$
$$\left(96 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2\right) +$$
$$\frac{\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(11 A \operatorname{Sin}\left[\frac{d x}{2}\right] + 9 B \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{24 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] - \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] - \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)} +$$
$$\frac{A \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \operatorname{Sin}\left[\frac{d x}{2}\right]}{48 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^3} +$$
$$\left(\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(-10 A \operatorname{Cos}\left[\frac{c}{2}\right] - 3 B \operatorname{Cos}\left[\frac{c}{2}\right] - 8 A \operatorname{Sin}\left[\frac{c}{2}\right] - 3 B \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right) \Big/$$
$$\left(96 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)^2\right) +$$
$$\frac{\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^6 \left(11 A \operatorname{Sin}\left[\frac{d x}{2}\right] + 9 B \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{24 d \left(\operatorname{Cos}\left[\frac{c}{2}\right] + \operatorname{Sin}\left[\frac{c}{2}\right]\right) \left(\operatorname{Cos}\left[\frac{c}{2} + \frac{d x}{2}\right] + \operatorname{Sin}\left[\frac{c}{2} + \frac{d x}{2}\right]\right)}$$

Problem 32: Result more than twice size of optimal antiderivative.

$$\int \left(a + a \operatorname{Cos}[c + d x]\right)^4 \left(A + B \operatorname{Cos}[c + d x]\right) \operatorname{Sec}[c + d x]^2 \, dx$$

Optimal (type 3, 150 leaves, 7 steps):

$$\frac{1}{2} a^4 (13 A + 12 B) x + \frac{a^4 (4 A + B) \operatorname{ArcTanh}[\operatorname{Sin}[c + d x]]}{d} +$$
$$\frac{5 a^4 (A + 2 B) \operatorname{Sin}[c + d x]}{2 d} - \frac{(3 A - B) \left(a^2 + a^2 \operatorname{Cos}[c + d x]\right)^2 \operatorname{Sin}[c + d x]}{3 d} -$$
$$\frac{(3 A - 8 B) \left(a^4 + a^4 \operatorname{Cos}[c + d x]\right) \operatorname{Sin}[c + d x]}{6 d} + \frac{a A \left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Tan}[c + d x]}{d}$$

Result (type 3, 312 leaves):

$$\frac{1}{192} a^4 \left(1+\text{Cos}[c+d x]\right)^4 \text{Sec}\left[\frac{1}{2}(c+d x)\right]^8 \left(78 A x+72 B x-\frac{12 (4 A+B) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{12 (4 A+B) \text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right]}{d}+\frac{3 \left(16 A+27 B\right) \text{Cos}[d x] \text{Sin}[c]}{d}+\frac{3 (A+4 B) \text{Cos}[2 d x] \text{Sin}[2 c]}{d}+\frac{B \text{Cos}[3 d x] \text{Sin}[3 c]}{d}+\frac{3 \left(16 A+27 B\right) \text{Cos}[c] \text{Sin}[d x]}{d}+\frac{3 (A+4 B) \text{Cos}[2 c] \text{Sin}[2 d x]}{d}+\frac{B \text{Cos}[3 c] \text{Sin}[3 d x]}{d}+\frac{12 A \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}+\frac{12 A \text{Sin}\left[\frac{d x}{2}\right]}{d \left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right) \left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)}\right)$$

Problem 33: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 162 leaves, 7 steps):

$$\frac{1}{2} a^4 \left(8 A+13 B\right) x+\frac{a^4 \left(13 A+8 B\right) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d}-\frac{5 a^4 (A-B) \text{Sin}[c+d x]}{2 d}-\frac{(6 A+B) \left(a^4+a^4 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{2 d}+\frac{\left(5 A+2 B\right) \left(a^2+a^2 \text{Cos}[c+d x]\right)^2 \text{Tan}[c+d x]}{2 d}+\frac{a A \left(a+a \text{Cos}[c+d x]\right)^3 \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 688 leaves):

$$\frac{1}{32}(8A+13B)\,x\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+\frac{1}{32\,d}$$
$$(-13A-8B)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+$$
$$\frac{1}{32\,d}(13A+8B)\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8+$$
$$\frac{(A+4B)\,\text{Cos}[d\,x]\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}[c]}{16\,d}+$$
$$\frac{B\,\text{Cos}[2\,d\,x]\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}[2\,c]}{64\,d}+$$
$$\frac{(A+4B)\,\text{Cos}[c]\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}[d\,x]}{16\,d}+$$
$$\frac{B\,\text{Cos}[2\,c]\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\text{Sin}[2\,d\,x]}{64\,d}+\frac{A\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{64\,d\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+$$
$$\frac{(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\left(4\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{16\,d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}-$$
$$\frac{A\,(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8}{64\,d\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^2}+\frac{(a+a\,\text{Cos}[c+d\,x])^4\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\left(4\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{16\,d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}$$

Problem 34: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 165 leaves, 7 steps):

$$a^4\,(A+4B)\,x+\frac{a^4\,(12A+13B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,d}-$$
$$\frac{5\,a^4\,(2A+B)\,\text{Sin}[c+d\,x]}{2\,d}+\frac{(11A+9B)\,(a^4+a^4\,\text{Cos}[c+d\,x])\,\text{Tan}[c+d\,x]}{3\,d}+$$
$$\frac{(2A+B)\,(a^2+a^2\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}+$$
$$\frac{a\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 380 leaves):

$$a^4 \left(\frac{(A+4B)(c+dx)}{d} + \frac{(-12A-13B)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right]}{2d} + \frac{(12A+13B)\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right]}{2d} + \frac{13A+3B}{12d\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2} + \frac{A\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]}{6d\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3} + \frac{A\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]}{6d\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^3} + \frac{-13A-3B}{12d\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)^2} + \frac{4\left(5A\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]+3B\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{3d\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)} + \frac{4\left(5A\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]+3B\,\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)}{3d\left(\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]\right)} + \frac{B\,\mathrm{Sin}[c+dx]}{d} \right)$$

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

$$\int \frac{\mathrm{Cos}[c+dx]^4\,(A+B\,\mathrm{Cos}[c+dx])}{a+a\,\mathrm{Cos}[c+dx]}\,dx$$

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

$$-\frac{3(4A-5B)x}{8a} + \frac{4(A-B)\,\mathrm{Sin}[c+dx]}{a\,d} - \frac{3(4A-5B)\,\mathrm{Cos}[c+dx]\,\mathrm{Sin}[c+dx]}{8a\,d} - \frac{(4A-5B)\,\mathrm{Cos}[c+dx]^3\,\mathrm{Sin}[c+dx]}{4a\,d} + \frac{(A-B)\,\mathrm{Cos}[c+dx]^4\,\mathrm{Sin}[c+dx]}{d\,(a+a\,\mathrm{Cos}[c+dx])} - \frac{4(A-B)\,\mathrm{Sin}[c+dx]^3}{3a\,d}$$

Result (type 3, 311 leaves):

$$\frac{1}{192\,a\,d\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\,\mathrm{Sec}\left[\frac{c}{2}\right] \left(-72(4A-5B)\,d\,x\,\mathrm{Cos}\left[\frac{dx}{2}\right] - 72(4A-5B)\,d\,x\,\mathrm{Cos}\left[c+\frac{dx}{2}\right] + 552A\,\mathrm{Sin}\left[\frac{dx}{2}\right] - 552B\,\mathrm{Sin}\left[\frac{dx}{2}\right] + 168A\,\mathrm{Sin}\left[c+\frac{dx}{2}\right] - 168B\,\mathrm{Sin}\left[c+\frac{dx}{2}\right] + 144A\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right] - 120B\,\mathrm{Sin}\left[c+\frac{3dx}{2}\right] + 144A\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right] - 120B\,\mathrm{Sin}\left[2c+\frac{3dx}{2}\right] - 16A\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right] + 40B\,\mathrm{Sin}\left[2c+\frac{5dx}{2}\right] - 16A\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right] + 40B\,\mathrm{Sin}\left[3c+\frac{5dx}{2}\right] + 8A\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right] - 5B\,\mathrm{Sin}\left[3c+\frac{7dx}{2}\right] + 8A\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right] - 5B\,\mathrm{Sin}\left[4c+\frac{7dx}{2}\right] + 3B\,\mathrm{Sin}\left[4c+\frac{9dx}{2}\right] + 3B\,\mathrm{Sin}\left[5c+\frac{9dx}{2}\right]\right)$$

Problem 39: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 122 leaves, 6 steps):

$$\frac{3\,(A-B)\,x}{2\,a}-\frac{(3\,A-4\,B)\,\text{Sin}[c+d x]}{a\,d}+\frac{3\,(A-B)\,\text{Cos}[c+d x]\,\text{Sin}[c+d x]}{2\,a\,d}+\frac{(A-B)\,\text{Cos}[c+d x]^3\,\text{Sin}[c+d x]}{d\,(a+a\,\text{Cos}[c+d x])}+\frac{(3\,A-4\,B)\,\text{Sin}[c+d x]^3}{3\,a\,d}$$

Result (type 3, 249 leaves):

$$\frac{1}{24\,a\,d\,(1+\text{Cos}[c+d x])}\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\Big(36\,(A-B)\,d\,x\,\text{Cos}\Big[\frac{d x}{2}\Big]+36\,(A-B)\,d\,x\,\text{Cos}\Big[c+\frac{d x}{2}\Big]-60\,A\,\text{Sin}\Big[\frac{d x}{2}\Big]+69\,B\,\text{Sin}\Big[\frac{d x}{2}\Big]-12\,A\,\text{Sin}\Big[c+\frac{d x}{2}\Big]+21\,B\,\text{Sin}\Big[c+\frac{d x}{2}\Big]-9\,A\,\text{Sin}\Big[c+\frac{3 d x}{2}\Big]+18\,B\,\text{Sin}\Big[c+\frac{3 d x}{2}\Big]-9\,A\,\text{Sin}\Big[2 c+\frac{3 d x}{2}\Big]+18\,B\,\text{Sin}\Big[2 c+\frac{3 d x}{2}\Big]+3\,A\,\text{Sin}\Big[2 c+\frac{5 d x}{2}\Big]-2\,B\,\text{Sin}\Big[2 c+\frac{5 d x}{2}\Big]+3\,A\,\text{Sin}\Big[3 c+\frac{5 d x}{2}\Big]-2\,B\,\text{Sin}\Big[3 c+\frac{5 d x}{2}\Big]+B\,\text{Sin}\Big[3 c+\frac{7 d x}{2}\Big]+B\,\text{Sin}\Big[4 c+\frac{7 d x}{2}\Big]\Big)$$

Problem 40: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 90 leaves, 2 steps):

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

Result (type 3, 197 leaves):

$$\Big(\text{Cos}\Big[\frac{1}{2}(c+d x)\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\Big(-4\,(2\,A-3\,B)\,d\,x\,\text{Cos}\Big[\frac{d x}{2}\Big]-4\,(2\,A-3\,B)\,d\,x\,\text{Cos}\Big[c+\frac{d x}{2}\Big]+20\,A\,\text{Sin}\Big[\frac{d x}{2}\Big]-20\,B\,\text{Sin}\Big[\frac{d x}{2}\Big]+4\,A\,\text{Sin}\Big[c+\frac{d x}{2}\Big]-4\,B\,\text{Sin}\Big[c+\frac{d x}{2}\Big]+4\,A\,\text{Sin}\Big[c+\frac{3 d x}{2}\Big]-3\,B\,\text{Sin}\Big[c+\frac{3 d x}{2}\Big]+4\,A\,\text{Sin}\Big[2 c+\frac{3 d x}{2}\Big]-3\,B\,\text{Sin}\Big[2 c+\frac{3 d x}{2}\Big]+B\,\text{Sin}\Big[2 c+\frac{5 d x}{2}\Big]+B\,\text{Sin}\Big[3 c+\frac{5 d x}{2}\Big]\Big)\Big)\Big/\big(8\,a\,d\,(1+\text{Cos}[c+d x])\big)$$

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

$$\int \frac{\text{Cos}[c+d x] \,(A+B\,\text{Cos}[c+d x])}{a+a\,\text{Cos}[c+d x]}\,dx$$

Optimal (type 3, 54 leaves, 5 steps):

$$\frac{(A-B)\,x}{a}+\frac{B\,\text{Sin}[c+d x]}{a d}-\frac{(A-B)\,\text{Sin}[c+d x]}{a d\,(1+\text{Cos}[c+d x])}$$

Result (type 3, 126 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]\text{Sec}\left[\frac{c}{2}\right]\left(2\,(A-B)\,d x\,\text{Cos}\left[\frac{d x}{2}\right]+2\,(A-B)\,d x\,\text{Cos}\left[c+\frac{d x}{2}\right]-4\,A\,\text{Sin}\left[\frac{d x}{2}\right]+5\,B\,\text{Sin}\left[\frac{d x}{2}\right]+B\,\text{Sin}\left[c+\frac{d x}{2}\right]+B\,\text{Sin}\left[c+\frac{3 d x}{2}\right]+B\,\text{Sin}\left[2 c+\frac{3 d x}{2}\right]\right)\right)\Big/\left(2\,a\,d\,(1+\text{Cos}[c+d x])\right)$$

Problem 42: Result more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Cos}[c+d x]}{a+a\,\text{Cos}[c+d x]}\,dx$$

Optimal (type 3, 34 leaves, 2 steps):

$$\frac{B\,x}{a}+\frac{(A-B)\,\text{Sin}[c+d x]}{d\,(a+a\,\text{Cos}[c+d x])}$$

Result (type 3, 72 leaves):

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

Problem 43: Result more than twice size of optimal antiderivative.

$$\int \frac{(A+B\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+a\,\text{Cos}[c+d x]}\,dx$$

Optimal (type 3, 44 leaves, 3 steps):

$$\frac{A\,\text{ArcTanh}[\text{Sin}[c+d x]]}{a d}-\frac{(A-B)\,\text{Sin}[c+d x]}{d\,(a+a\,\text{Cos}[c+d x])}$$

Result (type 3, 109 leaves):

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

Problem 44: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 69 leaves, 5 steps):

$$-\frac{(A-B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a\,d}+\frac{(2\,A-B)\,\text{Tan}[c+d\,x]}{a\,d}-\frac{(A-B)\,\text{Tan}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 3, 201 leaves):

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

Problem 45: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 107 leaves, 6 steps):

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

Result (type 3, 289 leaves):

$$\frac{1}{2\,a\,d\,\left(1+\text{Cos}[c+d\,x]\right)}\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\left(4\,\left(-A+B\right)\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+\right.$$
$$\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\left((-6\,A+4\,B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+\right.$$
$$6\,A\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]-4\,B\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+$$
$$\frac{A}{\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^2}-\frac{A}{\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^2}-$$
$$\left(4\,(A-B)\,\text{Sin}[d\,x]\right)\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\right.$$
$$\left.\left.\left.\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)\right)\right)\right)$$

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

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^4}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 3, 131 leaves, 6 steps):

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

Result (type 3, 569 leaves):

$$\frac{3\ (A-B)\ \text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\ \left(a+a\,\text{Cos}[c+d\,x]\right)}-$$
$$\frac{3\ (A-B)\ \text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\ \left(a+a\,\text{Cos}[c+d\,x]\right)}+$$
$$\frac{1}{48\,d\ \left(a+a\,\text{Cos}[c+d\,x]\right)}\ \text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\ \text{Sec}\left[\frac{c}{2}\right]\ \text{Sec}[c]\ \text{Sec}[c+d\,x]^3$$
$$\left(6\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+6\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+39\,A\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-27\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-24\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+12\,B\right.$$
$$\text{Sin}\left[c-\frac{d\,x}{2}\right]-6\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+6\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-24\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+24\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+$$
$$21\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+9\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$9\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+9\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+7\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-3\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+$$
$$A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-3\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-$$
$$9\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+9\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+16\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-12\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+$$
$$\left.10\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-6\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+6\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-6\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 47: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 170 leaves, 7 steps):

$$\frac{(7\,A-10\,B)\ x}{2\,a^2}-\frac{4\ (2\,A-3\,B)\ \text{Sin}[c+d\,x]}{a^2\,d}+$$
$$\frac{(7\,A-10\,B)\ \text{Cos}[c+d\,x]\ \text{Sin}[c+d\,x]}{2\,a^2\,d}+\frac{(7\,A-10\,B)\ \text{Cos}[c+d\,x]^3\ \text{Sin}[c+d\,x]}{3\,a^2\,d\ \left(1+\text{Cos}[c+d\,x]\right)}+$$
$$\frac{(A-B)\ \text{Cos}[c+d\,x]^4\ \text{Sin}[c+d\,x]}{3\,d\ \left(a+a\,\text{Cos}[c+d\,x]\right)^2}+\frac{4\ (2\,A-3\,B)\ \text{Sin}[c+d\,x]^3}{3\,a^2\,d}$$

Result (type 3, 369 leaves):

$$\frac{1}{48\,a^2\,d\,\left(1+\text{Cos}[c+d\,x]\right)^2}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(36\,(7\,A-10\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+36\,(7\,A-10\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+84\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-120\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+84\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-120\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-381\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+516\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+147\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-156\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-239\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+342\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-63\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+118\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-15\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-15\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+30\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-3\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-3\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 48: Result more than twice size of optimal antiderivative.

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

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

$$-\frac{(4\,A-7\,B)\,x}{2\,a^2}+\frac{2\,(5\,A-8\,B)\,\text{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{(4\,A-7\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^2\,d}+\frac{(5\,A-8\,B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\left(1+\text{Cos}[c+d\,x]\right)}+\frac{(A-B)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}$$

Result (type 3, 315 leaves):

$$\frac{1}{48\,a^2\,d\,\left(1+\text{Cos}[c+d\,x]\right)^2}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(-36\,(4\,A-7\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-36\,(4\,A-7\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-48\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+84\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-48\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+84\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+264\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-381\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-120\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+147\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+164\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-239\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+36\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-63\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+12\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-15\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+12\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-15\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

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

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

Optimal (type 3, 70 leaves, 4 steps):

$$\frac{B x}{a^2}+\frac{(2 A-5 B) \, \text{Sin}[c+d x]}{3 a^2 d \, (1+\text{Cos}[c+d x])}-\frac{(A-B) \, \text{Sin}[c+d x]}{3 d \, (a+a \, \text{Cos}[c+d x])^2}$$

Result (type 3, 153 leaves):

$$\frac{1}{24 a^2 d} \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2} (c+d x)\right]^3 \left(9 B d x \, \text{Cos}\left[\frac{d x}{2}\right]+9 B d x \, \text{Cos}\left[c+\frac{d x}{2}\right]+ 3 B d x \, \text{Cos}\left[c+\frac{3 d x}{2}\right]+3 B d x \, \text{Cos}\left[2 c+\frac{3 d x}{2}\right]+6 A \, \text{Sin}\left[\frac{d x}{2}\right]-18 B \, \text{Sin}\left[\frac{d x}{2}\right]- 6 A \, \text{Sin}\left[c+\frac{d x}{2}\right]+12 B \, \text{Sin}\left[c+\frac{d x}{2}\right]+4 A \, \text{Sin}\left[c+\frac{3 d x}{2}\right]-10 B \, \text{Sin}\left[c+\frac{3 d x}{2}\right]\right)$$

Problem 52: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 79 leaves, 4 steps):

$$\frac{A \, \text{ArcTanh}[\text{Sin}[c+d x]]}{a^2 d}-\frac{(4 A-B) \, \text{Sin}[c+d x]}{3 a^2 d \, (1+\text{Cos}[c+d x])}-\frac{(A-B) \, \text{Sin}[c+d x]}{3 d \, (a+a \, \text{Cos}[c+d x])^2}$$

Result (type 3, 170 leaves):

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

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

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

Optimal (type 3, 107 leaves, 6 steps):

$$-\frac{(2A-B)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{a^2 d}+\frac{2\,(5A-2B)\,\text{Tan}[c+dx]}{3a^2 d}-\frac{(2A-B)\,\text{Tan}[c+dx]}{a^2 d\,(1+\text{Cos}[c+dx])}-\frac{(A-B)\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 3, 264 leaves):

$$\frac{1}{3a^2 d\,(1+\text{Cos}[c+dx])^2}2\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\left((A-B)\,\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]+2\,(7A-4B)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^2\text{Sec}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]+6\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left((2A-B)\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right]\right)+(A\,\text{Sin}[dx])\Big/\left(\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]-\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]+\text{Sin}\left[\frac{1}{2}(c+dx)\right]\right)\right)\right)+(A-B)\,\text{Cos}\left[\frac{1}{2}(c+dx)\right]\text{Tan}\left[\frac{c}{2}\right]\right)$$

Problem 54: Result more than twice size of optimal antiderivative.

$$\int\frac{(A+B\,\text{Cos}[c+dx])\,\text{Sec}[c+dx]^3}{(a+a\,\text{Cos}[c+dx])^2}\,dx$$

Optimal (type 3, 152 leaves, 7 steps):

$$\frac{(7A-4B)\,\text{ArcTanh}[\text{Sin}[c+dx]]}{2a^2 d}-\frac{2\,(8A-5B)\,\text{Tan}[c+dx]}{3a^2 d}+\frac{(7A-4B)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{2a^2 d}-\frac{(8A-5B)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{3a^2 d\,(1+\text{Cos}[c+dx])}-\frac{(A-B)\,\text{Sec}[c+dx]\,\text{Tan}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 3, 574 leaves):

$$-\frac{2\,(7\,A-4\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}+$$
$$\frac{2\,(7\,A-4\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}+$$
$$\frac{1}{48\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2$$
$$\left(14\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-14\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-97\,A\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+64\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+126\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]-84\,B\right.$$
$$\text{Sin}\left[c-\frac{d\,x}{2}\right]-42\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+42\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+98\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-56\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+$$
$$3\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-6\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-37\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+34\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$
$$63\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-36\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-75\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+48\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-$$
$$15\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+6\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-39\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+30\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+$$
$$21\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-12\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-32\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+20\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-$$
$$\left.12\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+6\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-20\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+14\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

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

$$\int\frac{\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^4}{\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 3, 179 leaves, 7 steps):

$$-\frac{(10\,A-7\,B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^2\,d}+\frac{4\,(3\,A-2\,B)\,\text{Tan}[c+d\,x]}{a^2\,d}-$$
$$\frac{(10\,A-7\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^2\,d}-\frac{(10\,A-7\,B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,a^2\,d\,\left(1+\text{Cos}[c+d\,x]\right)}-$$
$$\frac{(A-B)\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}+\frac{4\,(3\,A-2\,B)\,\text{Tan}[c+d\,x]^3}{3\,a^2\,d}$$

Result (type 3, 686 leaves):

$$\frac{2\,(10\,A-7\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(a+a\,\text{Cos}[c+d\,x])^2}-$$

$$\frac{2\,(10\,A-7\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Log}\left[\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(a+a\,\text{Cos}[c+d\,x])^2}+$$

$$\frac{1}{96\,d\,(a+a\,\text{Cos}[c+d\,x])^2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3$$

$$\left(-6\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+45\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+310\,A\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-201\,B\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-306\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+\right.$$

$$195\,B\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+42\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-51\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-270\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+$$

$$189\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+50\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+90\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$

$$81\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-170\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+119\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+$$

$$198\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-129\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+42\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-9\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$

$$66\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-57\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-90\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+$$

$$63\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+114\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-75\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+$$

$$36\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-15\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+48\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-39\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-$$

$$30\,A\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+21\,B\,\text{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+48\,A\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-32\,B\,\text{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+$$

$$\left.22\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-12\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+26\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-20\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 56: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 218 leaves, 8 steps):

$$\frac{(13\,A-23\,B)\,x}{2\,a^3}-\frac{4\,(19\,A-34\,B)\,\text{Sin}[c+d\,x]}{5\,a^3\,d}+\frac{(13\,A-23\,B)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^3\,d}+$$

$$\frac{(A-B)\,\text{Cos}[c+d\,x]^5\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}+\frac{(8\,A-13\,B)\,\text{Cos}[c+d\,x]^4\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}+$$

$$\frac{(13\,A-23\,B)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{3\,d\,(a^3+a^3\,\text{Cos}[c+d\,x])}+\frac{4\,(19\,A-34\,B)\,\text{Sin}[c+d\,x]^3}{15\,a^3\,d}$$

Result (type 3, 491 leaves):

$$\frac{1}{480\,a^3\,d\,\left(1+\text{Cos}[c+d\,x]\right)^3}\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\text{Sec}\left[\frac{c}{2}\right]\left(600\,\left(13\,A-23\,B\right)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+600\,\left(13\,A-23\,B\right)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+\right.$$
$$3900\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-6900\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+3900\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$6900\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+780\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-1380\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$780\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-1380\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-12\,760\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+20\,410\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$7560\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-11\,110\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-9230\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+15\,380\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$
$$930\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-380\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-2782\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+4777\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$
$$750\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+1625\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-105\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+230\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-$$
$$105\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+230\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+15\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-20\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+$$
$$\left.15\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-20\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+5\,B\,\text{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+5\,B\,\text{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]\right)$$

Problem 57: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^4\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 3, 193 leaves, 4 steps):

$$-\frac{\left(6\,A-13\,B\right)\,x}{2\,a^3}+\frac{8\,\left(9\,A-19\,B\right)\,\text{Sin}[c+d\,x]}{15\,a^3\,d}-\frac{\left(6\,A-13\,B\right)\,\text{Cos}[c+d\,x]\,\text{Sin}[c+d\,x]}{2\,a^3\,d}+\frac{\left(A-B\right)\,\text{Cos}[c+d\,x]^4\,\text{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}+$$
$$\frac{\left(6\,A-11\,B\right)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}+\frac{4\,\left(9\,A-19\,B\right)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{15\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 3, 435 leaves):

$$\frac{1}{480\,a^3\,d\,\left(1+\text{Cos}[c+d\,x]\right)^3}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(-600\,(6\,A-13\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-600\,(6\,A-13\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-1800\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+3900\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-1800\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+3900\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-360\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+780\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-360\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+780\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+7020\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-12\,760\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-4500\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+7560\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+4860\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-9230\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-900\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+930\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+1452\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-2782\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+300\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-750\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+60\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-105\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+60\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-105\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 58: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 147 leaves, 7 steps):

$$\frac{(A-3\,B)\,x}{a^3}-\frac{(7\,A-27\,B)\,\text{Sin}[c+d\,x]}{15\,a^3\,d}+\frac{(A-B)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}+\frac{(4\,A-9\,B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}-\frac{(A-3\,B)\,\text{Sin}[c+d\,x]}{d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 3, 361 leaves):

$$\frac{1}{120\, a^3\, d\, \left(1+\text{Cos}[c+d\, x]\right)^3}\text{Cos}\left[\frac{1}{2}\,(c+d\, x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(300\,(A-3\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+300\,(A-3\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+150\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-450\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+150\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-450\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+30\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-90\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+30\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-90\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-740\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+1755\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+540\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-1125\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-460\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+1215\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+180\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-225\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-128\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+363\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+75\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)$$

Problem 59: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 116 leaves, 5 steps):

$$\frac{B\,x}{a^3}+\frac{(A-B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}-\frac{(2\,A-7\,B)\,\text{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}+\frac{(4\,A-29\,B)\,\text{Sin}[c+d\,x]}{15\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 3, 241 leaves):

$$\frac{1}{480\,a^3\,d}\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(150\,B\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+150\,B\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+75\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+75\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+15\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+15\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+80\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-370\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-60\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+270\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+40\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-230\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-30\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+90\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+14\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-64\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]\right)$$

Problem 63: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^2}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 3, 145 leaves, 7 steps):

$$-\frac{(3A-B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{a^3\,d}+\frac{2\,(36A-11B)\,\text{Tan}[c+d\,x]}{15\,a^3\,d}-\frac{(A-B)\,\text{Tan}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{(9A-4B)\,\text{Tan}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(3A-B)\,\text{Tan}[c+d\,x]}{d\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 3, 482 leaves):

$$\frac{1}{120\,a^3\,d\,(1+\text{Cos}[c+d\,x])^3}\left(960\,(3A-B)\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^6\left(\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\right)+\right.$$
$$\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]\,\text{Sec}[c+d\,x]$$
$$\left(-5\,(51A-32B)\,\text{Sin}\left[\frac{d\,x}{2}\right]+(567A-167B)\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]-600\,A\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+\right.$$
$$170\,B\,\text{Sin}\left[c-\frac{d\,x}{2}\right]+375\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-170\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-480\,A\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]+$$
$$160\,B\,\text{Sin}\left[2\,c+\frac{d\,x}{2}\right]-60\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+75\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+402\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$167\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-225\,A\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+75\,B\,\text{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+315\,A\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]-$$
$$95\,B\,\text{Sin}\left[c+\frac{5\,d\,x}{2}\right]+30\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+240\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-$$
$$95\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-45\,A\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+15\,B\,\text{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+72\,A\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-$$
$$\left.\left.22\,B\,\text{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+15\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+57\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-22\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]\right)\right)$$

Problem 64: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 196 leaves, 8 steps):

$$\frac{(13A-6B)\,\text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^3\,d}-\frac{8\,(19A-9B)\,\text{Tan}[c+d\,x]}{15\,a^3\,d}+\frac{(13A-6B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a^3\,d}-\frac{(A-B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-\frac{(11A-6B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{4\,(19A-9B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{15\,d\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 3, 686 leaves):

$$-\frac{4\,(13\,A-6\,B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}+$$
$$\frac{4\,(13\,A-6\,B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}+$$
$$\frac{1}{480\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2$$
$$\left(1235\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-870\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-3805\,A\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+1830\,B\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+\right.$$
$$4329\,A\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-2094\,B\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-1989\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+1314\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+$$
$$3575\,A\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-1650\,B\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]+475\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-450\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-$$
$$2005\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+1230\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+2275\,A\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-$$
$$1050\,B\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-2673\,A\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]+1278\,B\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]-105\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$
$$90\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-1593\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+918\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+975\,A\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-$$
$$450\,B\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-1325\,A\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+630\,B\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-$$
$$255\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+60\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-875\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+480\,B\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+$$
$$195\,A\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-90\,B\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-304\,A\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+144\,B\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-$$
$$\left.90\,A\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+30\,B\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-214\,A\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+114\,B\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 65: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^5\,(A+B\,\mathrm{Cos}[c+d\,x])}{(a+a\,\mathrm{Cos}[c+d\,x])^4}\,dx$$

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

$$-\frac{(8\,A-21\,B)\,x}{2\,a^4}+\frac{8\,(83\,A-216\,B)\,\mathrm{Sin}[c+d\,x]}{105\,a^4\,d}-\frac{(8\,A-21\,B)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Sin}[c+d\,x]}{2\,a^4\,d}+$$
$$\frac{(52\,A-129\,B)\,\mathrm{Cos}[c+d\,x]^3\,\mathrm{Sin}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+d\,x])^2}+\frac{4\,(83\,A-216\,B)\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{Sin}[c+d\,x]}{105\,a^4\,d\,(1+\mathrm{Cos}[c+d\,x])}+$$
$$\frac{(A-B)\,\mathrm{Cos}[c+d\,x]^5\,\mathrm{Sin}[c+d\,x]}{7\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}+\frac{(A-2\,B)\,\mathrm{Cos}[c+d\,x]^4\,\mathrm{Sin}[c+d\,x]}{5\,a\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^3}$$

Result (type 3, 555 leaves):

$$\frac{1}{6720\,a^4\,d\,\left(1+\text{Cos}[c+d\,x]\right)^4}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\left(-14\,700\,(8\,A-21\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]-14\,700\,(8\,A-21\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]-70\,560\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+185\,220\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-70\,560\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+185\,220\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-23\,520\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+61\,740\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-23\,520\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+61\,740\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-3360\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+8820\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]-3360\,A\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]+8820\,B\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]+243\,320\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-539\,490\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]-184\,520\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+386\,190\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]+184\,464\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-422\,478\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]-72\,240\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+132\,930\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+77\,168\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-181\,461\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-8400\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+3675\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+15\,164\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-36\,003\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+2940\,A\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-9555\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+420\,A\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-945\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+420\,A\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-945\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+105\,B\,\text{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+105\,B\,\text{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]\right)$$

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

$$\int\frac{\text{Cos}[c+d\,x]^4\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^4}\,dx$$

Optimal (type 3, 185 leaves, 8 steps):

$$\frac{(A-4\,B)\,x}{a^4}-\frac{(55\,A-244\,B)\,\text{Sin}[c+d\,x]}{105\,a^4\,d}+\frac{(25\,A-88\,B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{105\,a^4\,d\,\left(1+\text{Cos}[c+d\,x]\right)^2}-\frac{(A-4\,B)\,\text{Sin}[c+d\,x]}{a^4\,d\,\left(1+\text{Cos}[c+d\,x]\right)}+\frac{(A-B)\,\text{Cos}[c+d\,x]^4\,\text{Sin}[c+d\,x]}{7\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^4}+\frac{(5\,A-12\,B)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{35\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}$$

Result (type 3, 481 leaves):

$$\frac{1}{1680\, a^4\, d\, \left(1+\text{Cos}[c+d\,x]\right)^4}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sec}\left[\frac{c}{2}\right]\left(7350\,(A-4\,B)\,d\,x\,\text{Cos}\left[\frac{d\,x}{2}\right]+7350\,(A-4\,B)\,d\,x\,\text{Cos}\left[c+\frac{d\,x}{2}\right]+\right.$$
$$4410\,A\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]-17\,640\,B\,d\,x\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]+4410\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$17\,640\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{3\,d\,x}{2}\right]+1470\,A\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]-5880\,B\,d\,x\,\text{Cos}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$1470\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]-5880\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{5\,d\,x}{2}\right]+210\,A\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]-$$
$$840\,B\,d\,x\,\text{Cos}\left[3\,c+\frac{7\,d\,x}{2}\right]+210\,A\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]-840\,B\,d\,x\,\text{Cos}\left[4\,c+\frac{7\,d\,x}{2}\right]-$$
$$19\,880\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+60\,830\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]+16\,520\,A\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-46\,130\,B\,\text{Sin}\left[c+\frac{d\,x}{2}\right]-$$
$$14\,280\,A\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+46\,116\,B\,\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+7560\,A\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-$$
$$18\,060\,B\,\text{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-5600\,A\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+19\,292\,B\,\text{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+$$
$$1680\,A\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-2100\,B\,\text{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-1040\,A\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+$$
$$\left.3791\,B\,\text{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+735\,B\,\text{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+105\,B\,\text{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+105\,B\,\text{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

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

$$\int \frac{\text{Cos}[c+d\,x]^3\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^4}\,dx$$

Optimal (type 3, 154 leaves, 6 steps):

$$\frac{B\,x}{a^4}-\frac{(6\,A-55\,B)\,\text{Sin}[c+d\,x]}{105\,a^4\,d\,\left(1+\text{Cos}[c+d\,x]\right)^2}+\frac{\left(12\,A-215\,B\right)\,\text{Sin}[c+d\,x]}{105\,a^4\,d\,\left(1+\text{Cos}[c+d\,x]\right)}+$$
$$\frac{(A-B)\,\text{Cos}[c+d\,x]^3\,\text{Sin}[c+d\,x]}{7\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^4}+\frac{\left(3\,A-10\,B\right)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{35\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}$$

Result (type 3, 329 leaves):

$$\frac{1}{13440\, a^4\, d} \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{1}{2}(c+d x)\right]^7 \left(3675\, B\, d\, x\, \text{Cos}\left[\frac{d x}{2}\right] + 3675\, B\, d\, x\, \text{Cos}\left[c+\frac{d x}{2}\right] + 2205\, B\, d\, x\, \text{Cos}\left[c+\frac{3 d x}{2}\right] + 2205\, B\, d\, x\, \text{Cos}\left[2 c+\frac{3 d x}{2}\right] + 735\, B\, d\, x\, \text{Cos}\left[2 c+\frac{5 d x}{2}\right] + 735\, B\, d\, x\, \text{Cos}\left[3 c+\frac{5 d x}{2}\right] + 105\, B\, d\, x\, \text{Cos}\left[3 c+\frac{7 d x}{2}\right] + 105\, B\, d\, x\, \text{Cos}\left[4 c+\frac{7 d x}{2}\right] + 1260\, A\, \text{Sin}\left[\frac{d x}{2}\right] - 9940\, B\, \text{Sin}\left[\frac{d x}{2}\right] - 1260\, A\, \text{Sin}\left[c+\frac{d x}{2}\right] + 8260\, B\, \text{Sin}\left[c+\frac{d x}{2}\right] + 882\, A\, \text{Sin}\left[c+\frac{3 d x}{2}\right] - 7140\, B\, \text{Sin}\left[c+\frac{3 d x}{2}\right] - 630\, A\, \text{Sin}\left[2 c+\frac{3 d x}{2}\right] + 3780\, B\, \text{Sin}\left[2 c+\frac{3 d x}{2}\right] + 294\, A\, \text{Sin}\left[2 c+\frac{5 d x}{2}\right] - 2800\, B\, \text{Sin}\left[2 c+\frac{5 d x}{2}\right] - 210\, A\, \text{Sin}\left[3 c+\frac{5 d x}{2}\right] + 840\, B\, \text{Sin}\left[3 c+\frac{5 d x}{2}\right] + 72\, A\, \text{Sin}\left[3 c+\frac{7 d x}{2}\right] - 520\, B\, \text{Sin}\left[3 c+\frac{7 d x}{2}\right]\right)$$

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

$$\int \frac{(A+B\, \text{Cos}[c+d x])\, \text{Sec}[c+d x]^2}{(a+a\, \text{Cos}[c+d x])^4}\, dx$$

Optimal (type 3, 175 leaves, 8 steps):

$$-\frac{(4 A-B)\, \text{ArcTanh}[\text{Sin}[c+d x]]}{a^4\, d} + \frac{8\,(83 A-20 B)\, \text{Tan}[c+d x]}{105\, a^4\, d} - \frac{(88 A-25 B)\, \text{Tan}[c+d x]}{105\, a^4\, d\,(1+\text{Cos}[c+d x])^2} - \frac{(4 A-B)\, \text{Tan}[c+d x]}{a^4\, d\,(1+\text{Cos}[c+d x])} - \frac{(A-B)\, \text{Tan}[c+d x]}{7\, d\,(a+a\, \text{Cos}[c+d x])^4} - \frac{(12 A-5 B)\, \text{Tan}[c+d x]}{35\, a\, d\,(a+a\, \text{Cos}[c+d x])^3}$$

Result (type 3, 670 leaves):

$$\frac{16\,(4\,A-B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^4}-$$

$$\frac{16\,(4\,A-B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^4}+$$

$$\frac{1}{1680\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^4}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]$$

$$\left(-10\,780\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+4165\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+18\,788\,A\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]-4445\,B\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]-\right.$$
$$20\,524\,A\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]+4795\,B\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]+14\,644\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-4795\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]-$$
$$16\,660\,A\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]+4165\,B\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-4690\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+2275\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$
$$14\,378\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-4445\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]-9100\,A\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+$$
$$2275\,B\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]+11\,668\,A\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]-2785\,B\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]-$$
$$630\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+735\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]+9358\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-$$
$$2785\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]-2940\,A\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+735\,B\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]+$$
$$4228\,A\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-1015\,B\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+315\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+$$
$$105\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]+3493\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-1015\,B\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]-$$
$$420\,A\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+105\,B\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]+664\,A\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-$$
$$\left.160\,B\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+105\,A\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+559\,A\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]-160\,B\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]\right)$$

Problem 73: Result more than twice size of optimal antiderivative.

$$\int\frac{(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^3}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^4}\,dx$$

Optimal (type 3, 232 leaves, 9 steps):

$$\frac{(21\,A-8\,B)\ \text{ArcTanh}[\text{Sin}[c+d\,x]]}{2\,a^4\,d}-\frac{8\ (216\,A-83\,B)\ \text{Tan}[c+d\,x]}{105\,a^4\,d}+\frac{(21\,A-8\,B)\ \text{Sec}[c+d\,x]\ \text{Tan}[c+d\,x]}{2\,a^4\,d}-\frac{(129\,A-52\,B)\ \text{Sec}[c+d\,x]\ \text{Tan}[c+d\,x]}{105\,a^4\,d\ (1+\text{Cos}[c+d\,x])^2}-\frac{4\ (216\,A-83\,B)\ \text{Sec}[c+d\,x]\ \text{Tan}[c+d\,x]}{105\,a^4\,d\ (1+\text{Cos}[c+d\,x])}-\frac{(A-B)\ \text{Sec}[c+d\,x]\ \text{Tan}[c+d\,x]}{7\,d\ (a+a\,\text{Cos}[c+d\,x])^4}-\frac{(2\,A-B)\ \text{Sec}[c+d\,x]\ \text{Tan}[c+d\,x]}{5\,a\,d\ (a+a\,\text{Cos}[c+d\,x])^3}$$

Result (type 3, 798 leaves) :

$$-\frac{8\,(21\,A-8\,B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}+$$

$$\frac{8\,(21\,A-8\,B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^8\,\mathrm{Log}\left[\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}+$$

$$\frac{1}{6720\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^4}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[c]\,\mathrm{Sec}[c+d\,x]^2$$

$$\Big(73\,206\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-38\,668\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-166\,668\,A\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+64\,384\,B\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]+$$

$$183\,162\,A\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-70\,896\,B\,\mathrm{Sin}\left[c-\frac{d\,x}{2}\right]-100\,842\,A\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+$$

$$50\,316\,B\,\mathrm{Sin}\left[c+\frac{d\,x}{2}\right]+155\,526\,A\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]-59\,248\,B\,\mathrm{Sin}\left[2\,c+\frac{d\,x}{2}\right]+$$

$$37\,380\,A\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-22\,820\,B\,\mathrm{Sin}\left[c+\frac{3\,d\,x}{2}\right]-101\,148\,A\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+$$

$$48\,004\,B\,\mathrm{Sin}\left[2\,c+\frac{3\,d\,x}{2}\right]+102\,900\,A\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-39\,200\,B\,\mathrm{Sin}\left[3\,c+\frac{3\,d\,x}{2}\right]-$$

$$119\,364\,A\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]+46\,032\,B\,\mathrm{Sin}\left[c+\frac{5\,d\,x}{2}\right]+8820\,A\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-$$

$$8750\,B\,\mathrm{Sin}\left[2\,c+\frac{5\,d\,x}{2}\right]-78\,204\,A\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+35\,742\,B\,\mathrm{Sin}\left[3\,c+\frac{5\,d\,x}{2}\right]+$$

$$49\,980\,A\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-19\,040\,B\,\mathrm{Sin}\left[4\,c+\frac{5\,d\,x}{2}\right]-64\,053\,A\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]+$$

$$24\,664\,B\,\mathrm{Sin}\left[2\,c+\frac{7\,d\,x}{2}\right]-3885\,A\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-1050\,B\,\mathrm{Sin}\left[3\,c+\frac{7\,d\,x}{2}\right]-$$

$$44\,733\,A\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+19\,834\,B\,\mathrm{Sin}\left[4\,c+\frac{7\,d\,x}{2}\right]+15\,435\,A\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-$$

$$5880\,B\,\mathrm{Sin}\left[5\,c+\frac{7\,d\,x}{2}\right]-21\,987\,A\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]+8456\,B\,\mathrm{Sin}\left[3\,c+\frac{9\,d\,x}{2}\right]-$$

$$3675\,A\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]+630\,B\,\mathrm{Sin}\left[4\,c+\frac{9\,d\,x}{2}\right]-16\,107\,A\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+$$

$$6986\,B\,\mathrm{Sin}\left[5\,c+\frac{9\,d\,x}{2}\right]+2205\,A\,\mathrm{Sin}\left[6\,c+\frac{9\,d\,x}{2}\right]-840\,B\,\mathrm{Sin}\left[6\,c+\frac{9\,d\,x}{2}\right]-$$

$$3456\,A\,\mathrm{Sin}\left[4\,c+\frac{11\,d\,x}{2}\right]+1328\,B\,\mathrm{Sin}\left[4\,c+\frac{11\,d\,x}{2}\right]-840\,A\,\mathrm{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]+$$

$$210\,B\,\mathrm{Sin}\left[5\,c+\frac{11\,d\,x}{2}\right]-2616\,A\,\mathrm{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]+1118\,B\,\mathrm{Sin}\left[6\,c+\frac{11\,d\,x}{2}\right]\Big)$$

Problem 78: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\,(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,dx$$

Optimal (type 3, 66 leaves, 3 steps):

$$\frac{2\sqrt{a}\ A\ \text{ArcTanh}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{d}+\frac{2\,a\,B\,\text{Sin}[c+d x]}{d\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 1393 leaves):

$$-\left(\left(\left(\left(\frac{1}{4}-\frac{i}{4}\right)A\left(1+e^{i c}\right)\left(\sqrt{2}-(1-i)\,e^{\frac{i c}{2}}+(16-16 i)\,e^{\frac{3 i c}{2}+i d x}+(20+20 i)\sqrt{2}\,e^{2 i c+\frac{3 i d x}{2}}-(34-34 i)\,e^{\frac{5 i c}{2}+2 i d x}-\right.\right.\right.\right.$$
$$(20+20 i)\sqrt{2}\,e^{3 i c+\frac{5 i d x}{2}}+(16-16 i)\,e^{\frac{7 i c}{2}+3 i d x}+(4+4 i)\sqrt{2}\,e^{4 i c+\frac{7 i d x}{2}}-$$
$$(1-i)\,e^{\frac{9 i c}{2}+4 i d x}+8 i\,e^{\frac{1}{2} i (c+d x)}-16\sqrt{2}\,e^{i (c+d x)}-40 i\,e^{\frac{3}{2} i (c+d x)}+34\sqrt{2}\,e^{2 i (c+d x)}+$$
$$\left.40 i\,e^{\frac{5}{2} i (c+d x)}-16\sqrt{2}\,e^{3 i (c+d x)}-8 i\,e^{\frac{7}{2} i (c+d x)}+\sqrt{2}\,e^{4 i (c+d x)}-(4+4 i)\sqrt{2}\,e^{\frac{1}{2} i (2 c+d x)}\right)$$
$$\left.x\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\Big/\left(\left(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i c}{2}}\right)\left(-1+e^{i c}\right)\right.$$
$$\left.\left.\left(i-2\sqrt{2}\,e^{\frac{1}{2} i (c+d x)}-4 i\,e^{i (c+d x)}+2\sqrt{2}\,e^{\frac{3}{2} i (c+d x)}+i\,e^{2 i (c+d x)}\right)^2\right)\right)-$$

$$\frac{1}{\sqrt{2}\,d}i\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\ \text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\ \text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]$$
$$\sqrt{a\left(1+\text{Cos}[c+d x]\right)}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]-\frac{1}{\sqrt{2}\,d}$$
$$i\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\ \text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\ \text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]$$
$$\sqrt{a\left(1+\text{Cos}[c+d x]\right)}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]-$$
$$\frac{1}{2\sqrt{2}\,d}A\sqrt{a\left(1+\text{Cos}[c+d x]\right)}$$
$$\text{Log}\left[2-\sqrt{2}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\ \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]-\frac{1}{2\sqrt{2}\,d}$$
$$A\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\ \text{Log}\left[2+\sqrt{2}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\ \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]+$$
$$\frac{2\,B\,\text{Cos}\left[\frac{d x}{2}\right]\sqrt{a\left(1+\text{Cos}[c+d x]\right)}\ \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{d}-$$

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

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

$$\left(\sqrt{2}\,A\,\sqrt{a\left(1+\text{Cos}[c+d\,x]\right)}\;\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right.$$

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

$$\left.\left.\frac{4\,i\,\sqrt{2}\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\text{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

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

Problem 79: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\;\left(A+B\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 68 leaves, 3 steps):

$$\frac{\sqrt{a}\;\left(A+2\,B\right)\text{ArcTanh}\left[\frac{\sqrt{a}\;\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}+\frac{a\,A\,\text{Tan}[c+d\,x]}{d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 470 leaves):

$$\frac{1}{8\,d}\sqrt{a\,(1+\text{Cos}[c+d\,x])}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]$$

$$\Bigg(2\sqrt{2}\,(A+2\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}$$

$$2\,\mathbb{i}\,(A+2\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+$$

$$\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}2\,\mathbb{i}\,(A+2\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]$$

$$\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}(A+2\,B)$$

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

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

$$\frac{4\,A}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}-\frac{4\,A}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\Bigg)$$

Problem 80: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\;(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 117 leaves, 4 steps):

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

Result (type 3, 567 leaves):

$$\frac{1}{32\,d}\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]$$
$$\left(-2\,i\,\sqrt{2}\,(3\,A+4\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]-\right.$$
$$2\,i\,\sqrt{2}\,(3\,A+4\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]+$$
$$2\,\sqrt{2}\,(3\,A+4\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$
$$\sqrt{2}\,(3\,A+4\,B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-$$
$$\sqrt{2}\,(3\,A+4\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+$$
$$\frac{8\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$
$$\frac{4\,(3\,A+4\,B)\,\text{Cos}\left[\frac{c}{2}\right]-4\,(A+4\,B)\,\text{Sin}\left[\frac{c}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}+$$
$$\frac{8\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-$$
$$\left.\frac{4\left((3\,A+4\,B)\,\text{Cos}\left[\frac{c}{2}\right]+(A+4\,B)\,\text{Sin}\left[\frac{c}{2}\right]\right)}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\right)$$

Problem 81: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{a+a\,\text{Cos}[c+d\,x]}\;(A+B\,\text{Cos}[c+d\,x])\;\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 160 leaves, 5 steps):

$$\frac{\sqrt{a}\,(5\,A+6\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a\,(5\,A+6\,B)\,\text{Tan}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a\,(5\,A+6\,B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 1108 leaves):

$$\frac{1}{16\sqrt{2}\,d}\,\mathrm{i}\,(-5A-6B)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{-\mathrm{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]$$
$$\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]+\frac{1}{16\sqrt{2}\,d}\,\mathrm{i}\,(-5A-6B)$$
$$\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\mathrm{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}{\mathrm{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]}\right]\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]+$$
$$\frac{1}{16\sqrt{2}\,d}(5A+6B)\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]+\frac{1}{32\sqrt{2}\,d}$$
$$(-5A-6B)\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]+$$
$$\frac{1}{32\sqrt{2}\,d}(-5A-6B)\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]+\frac{A\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]}{12\,d\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$
$$\frac{\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+2B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{8\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$
$$\left(\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(5A\,\mathrm{Cos}\left[\frac{c}{2}\right]+6B\,\mathrm{Cos}\left[\frac{c}{2}\right]-3A\,\mathrm{Sin}\left[\frac{c}{2}\right]-2B\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(16\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)-\frac{A\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]}{12\,d\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^3}+$$
$$\frac{\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+2B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{8\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)^2}+$$
$$\left(\sqrt{a\,(1+\mathrm{Cos}[c+dx])}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(-5A\,\mathrm{Cos}\left[\frac{c}{2}\right]-6B\,\mathrm{Cos}\left[\frac{c}{2}\right]-3A\,\mathrm{Sin}\left[\frac{c}{2}\right]-2B\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(16\,d\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)\right)$$

Problem 86: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+dx])^{3/2}\,(A+B\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]\,dx$$

Optimal (type 3, 105 leaves, 4 steps):

$$\frac{2a^{3/2}A\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+dx]}{\sqrt{a+a\,\mathrm{Cos}[c+dx]}}\right]}{d}+\frac{2a^2\,(3A+4B)\,\mathrm{Sin}[c+dx]}{3\,d\sqrt{a+a\,\mathrm{Cos}[c+dx]}}+\frac{2aB\sqrt{a+a\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{3\,d}$$

Result (type 3, 1531 leaves) :

$$-\Bigg(\Bigg(\Bigg(\left(\frac{1}{8}-\frac{i}{8}\right) A \left(1+e^{i c}\right)\Big(\sqrt{2}-(1-i)\, e^{\frac{i c}{2}}+(16-16 i)\, e^{\frac{3 i c}{2}+i d x}+(20+20 i) \sqrt{2}\, e^{2 i c+\frac{3 i d x}{2}}-(34-34 i)\, e^{\frac{5 i c}{2}+2 i d x}-(20+20 i) \sqrt{2}\, e^{3 i c+\frac{5 i d x}{2}}+(16-16 i)\, e^{\frac{7 i c}{2}+3 i d x}+(4+4 i) \sqrt{2}\, e^{4 i c+\frac{7 i d x}{2}}-(1-i)\, e^{\frac{9 i c}{2}+4 i d x}+8 i\, e^{\frac{1}{2} i (c+d x)}-16 \sqrt{2}\, e^{i (c+d x)}-40 i\, e^{\frac{3}{2} i (c+d x)}+34 \sqrt{2}\, e^{2 i (c+d x)}+40 i\, e^{\frac{5}{2} i (c+d x)}-16 \sqrt{2}\, e^{3 i (c+d x)}-8 i\, e^{\frac{7}{2} i (c+d x)}+\sqrt{2}\, e^{4 i (c+d x)}-(4+4 i) \sqrt{2}\, e^{\frac{1}{2} i (2 c+d x)}\Big) \times \left(a (1+\text{Cos}[c+d x])\right)^{3/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\Bigg)\Bigg/\Bigg(\Bigg(\left((-1-i)+\sqrt{2}\, e^{\frac{i c}{2}}\right) \left(-1+e^{i c}\right)\left(i-2 \sqrt{2}\, e^{\frac{1}{2} i (c+d x)}-4 i\, e^{i (c+d x)}+2 \sqrt{2}\, e^{\frac{3}{2} i (c+d x)}+i\, e^{2 i (c+d x)}\right)^2\Bigg)\Bigg)\Bigg)-$$

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

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

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

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

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

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

$$\left.\mathrm{Cot}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\right)\Big/\left(d\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(A\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\right.$$

$$\left(-d\,x\,\mathrm{Cos}\left[\frac{c}{2}\right]+2\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]+2\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right]\mathrm{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4\,\mathrm{i}\sqrt{2}\,\mathrm{ArcTan}\left[\frac{2\,\mathrm{i}\,\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{i}\left(-\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\mathrm{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right]\mathrm{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

$$\left(\sqrt{2}\,d\left(4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2\right)\right)+\frac{B\,\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{3\,c}{2}\right]}{6\,d}+$$

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

$$\frac{B\,\mathrm{Cos}\left[\frac{3\,c}{2}\right]\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]}{6\,d}$$

Problem 87: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\left(A+B\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]^2\,dx$$

Optimal (type 3, 103 leaves, 4 steps):

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

Result (type 3, 514 leaves):

$$\frac{1}{16\,d}\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3$$
$$\Bigg(2\sqrt{2}\,(3A+2B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+16\,B\,\text{Cos}\left[\frac{d\,x}{2}\right]\,\text{Sin}\left[\frac{c}{2}\right]+\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}$$
$$2\,\text{i}\,(3A+2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+$$
$$\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}2\,\text{i}\,(3A+2B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]$$
$$\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}(3A+2B)$$
$$\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}$$
$$(3A+2B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+$$
$$16\,B\,\text{Cos}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+\frac{4\,A}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}-$$
$$\frac{4\,A}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\Bigg)$$

Problem 88: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 119 leaves, 4 steps):

$$\frac{a^{3/2}\,(7A+12B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d}+\frac{a^2\,(5A+4B)\,\text{Tan}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 573 leaves):

$$\frac{1}{64\,d}\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3$$
$$\left(-2\,i\sqrt{2}\,(7A+12B)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-\right.$$
$$2\,i\sqrt{2}\,(7A+12B)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\mathrm{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+$$
$$2\sqrt{2}\,(7A+12B)\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\sqrt{2}\,(7A+12B)\,\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\sqrt{2}\,(7A+12B)\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+$$
$$\frac{8\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$\frac{4\,(7A+4B)\,\mathrm{Cos}\left[\frac{c}{2}\right]-4\,(5A+4B)\,\mathrm{Sin}\left[\frac{c}{2}\right]}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+$$
$$\frac{8\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-$$
$$\left.\frac{4\left((7A+4B)\,\mathrm{Cos}\left[\frac{c}{2}\right]+(5A+4B)\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)}{\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{Sin}\left[\frac{c}{2}\right]\right)\left(\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}\right)$$

Problem 89: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\left(A+B\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 164 leaves, 5 steps):

$$\frac{a^{3/2}\,(11A+14B)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a^2\,(11A+14B)\,\mathrm{Tan}[c+d\,x]}{8\,d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(7A+6B)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{12\,d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{a\,A\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 1132 leaves):

$$\frac{1}{32\sqrt{2}\,d}\,\mathrm{i}\,(-11\,A-14\,B)\,\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]-\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]-\sqrt{2}\,\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]}{-\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]+\sqrt{2}\,\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]-\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]}\Big]$$
$$(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3+\frac{1}{32\sqrt{2}\,d}\,\mathrm{i}\,(-11\,A-14\,B)$$
$$\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]+\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]-\sqrt{2}\,\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]}{\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]+\sqrt{2}\,\mathrm{Cos}[\frac{c}{4}+\frac{d\,x}{4}]-\mathrm{Sin}[\frac{c}{4}+\frac{d\,x}{4}]}\Big]\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3+$$
$$\frac{1}{32\sqrt{2}\,d}\,(11\,A+14\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Log}\Big[\sqrt{2}+2\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3+$$
$$\frac{1}{64\sqrt{2}\,d}\,(-11\,A-14\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}$$
$$\mathrm{Log}\Big[2-\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3+\frac{1}{64\sqrt{2}\,d}$$
$$(-11\,A-14\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Log}\Big[2+\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]$$
$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3+\frac{A\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^3}{24\,d\,(\mathrm{Cos}[\frac{c}{2}+\frac{d\,x}{2}]-\mathrm{Sin}[\frac{c}{2}+\frac{d\,x}{2}])^3}+$$
$$\frac{(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^3\,(3\,A\,\mathrm{Sin}[\frac{d\,x}{2}]+2\,B\,\mathrm{Sin}[\frac{d\,x}{2}])}{16\,d\,(\mathrm{Cos}[\frac{c}{2}]-\mathrm{Sin}[\frac{c}{2}])\,(\mathrm{Cos}[\frac{c}{2}+\frac{d\,x}{2}]-\mathrm{Sin}[\frac{c}{2}+\frac{d\,x}{2}])^2}+$$
$$\Big((a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3\,\Big(11\,A\,\mathrm{Cos}\Big[\frac{c}{2}\Big]+14\,B\,\mathrm{Cos}\Big[\frac{c}{2}\Big]-5\,A\,\mathrm{Sin}\Big[\frac{c}{2}\Big]-10\,B\,\mathrm{Sin}\Big[\frac{c}{2}\Big]\Big)\Big)\Big/$$
$$\Big(32\,d\,\Big(\mathrm{Cos}\Big[\frac{c}{2}\Big]-\mathrm{Sin}\Big[\frac{c}{2}\Big]\Big)\,\Big(\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big)\Big)-$$
$$\frac{A\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^3}{24\,d\,(\mathrm{Cos}[\frac{c}{2}+\frac{d\,x}{2}]+\mathrm{Sin}[\frac{c}{2}+\frac{d\,x}{2}])^3}+$$
$$\frac{(a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}\,\mathrm{Sec}[\frac{c}{2}+\frac{d\,x}{2}]^3\,(3\,A\,\mathrm{Sin}[\frac{d\,x}{2}]+2\,B\,\mathrm{Sin}[\frac{d\,x}{2}])}{16\,d\,(\mathrm{Cos}[\frac{c}{2}]+\mathrm{Sin}[\frac{c}{2}])\,(\mathrm{Cos}[\frac{c}{2}+\frac{d\,x}{2}]+\mathrm{Sin}[\frac{c}{2}+\frac{d\,x}{2}])^2}+\Big((a\,(1+\mathrm{Cos}[c+d\,x]))^{3/2}$$
$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^3\,\Big(-11\,A\,\mathrm{Cos}\Big[\frac{c}{2}\Big]-14\,B\,\mathrm{Cos}\Big[\frac{c}{2}\Big]-5\,A\,\mathrm{Sin}\Big[\frac{c}{2}\Big]-10\,B\,\mathrm{Sin}\Big[\frac{c}{2}\Big]\Big)\Big)\Big/$$
$$\Big(32\,d\,\Big(\mathrm{Cos}\Big[\frac{c}{2}\Big]+\mathrm{Sin}\Big[\frac{c}{2}\Big]\Big)\,\Big(\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]+\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big)\Big)$$

Problem 90: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 209 leaves, 6 steps):

$$\frac{a^{3/2}\left(75 A+88 B\right)\operatorname{ArcTanh}\left[\frac{\sqrt{a}\,\operatorname{Sin}[c+d x]}{\sqrt{a+a\operatorname{Cos}[c+d x]}}\right]}{64 d}+\frac{a^2\left(75 A+88 B\right)\operatorname{Tan}[c+d x]}{64 d\sqrt{a+a\operatorname{Cos}[c+d x]}}+\frac{a^2\left(75 A+88 B\right)\operatorname{Sec}[c+d x]\operatorname{Tan}[c+d x]}{96 d\sqrt{a+a\operatorname{Cos}[c+d x]}}+\frac{a^2\left(9 A+8 B\right)\operatorname{Sec}[c+d x]^2\operatorname{Tan}[c+d x]}{24 d\sqrt{a+a\operatorname{Cos}[c+d x]}}+\frac{a A\sqrt{a+a\operatorname{Cos}[c+d x]}\,\operatorname{Sec}[c+d x]^3\operatorname{Tan}[c+d x]}{4 d}$$

Result (type 3, 1416 leaves):

$$\frac{1}{256\sqrt{2}\,d}\,i\left(-75 A-88 B\right)\operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]$$
$$\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+\frac{1}{256\sqrt{2}\,d}\,i\left(-75 A-88 B\right)$$
$$\operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+$$
$$\frac{1}{256\sqrt{2}\,d}\left(75 A+88 B\right)\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\operatorname{Log}\left[\sqrt{2}+2\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+$$
$$\frac{1}{512\sqrt{2}\,d}\left(-75 A-88 B\right)\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}$$
$$\operatorname{Log}\left[2-\sqrt{2}\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+\frac{1}{512\sqrt{2}\,d}$$
$$\left(-75 A-88 B\right)\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\operatorname{Log}\left[2+\sqrt{2}\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]$$
$$\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3+\frac{A\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\operatorname{Sin}\left[\frac{d x}{2}\right]}{32 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}+$$
$$\left(\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(15 A\operatorname{Cos}\left[\frac{c}{2}\right]+8 B\operatorname{Cos}\left[\frac{c}{2}\right]-9 A\operatorname{Sin}\left[\frac{c}{2}\right]-8 B\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(192 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3\right)+$$
$$\frac{\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(19 A\operatorname{Sin}\left[\frac{d x}{2}\right]+24 B\operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{128 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\left(\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right.$$
$$\left.\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(75 A\operatorname{Cos}\left[\frac{c}{2}\right]+88 B\operatorname{Cos}\left[\frac{c}{2}\right]-37 A\operatorname{Sin}\left[\frac{c}{2}\right]-40 B\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(256 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)+$$
$$\frac{A\left(a\left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\operatorname{Sin}\left[\frac{d x}{2}\right]}{32 d\left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}+$$

$$\left(\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-15 A\,\text{Cos}\left[\frac{c}{2}\right]-8 B\,\text{Cos}\left[\frac{c}{2}\right]-9 A\,\text{Sin}\left[\frac{c}{2}\right]-8 B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/\left(192 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3\right)+\frac{\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(19 A\,\text{Sin}\left[\frac{d x}{2}\right]+24 B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{128 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\left(\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-75 A\,\text{Cos}\left[\frac{c}{2}\right]-88 B\,\text{Cos}\left[\frac{c}{2}\right]-37 A\,\text{Sin}\left[\frac{c}{2}\right]-40 B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/\left(256 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 94: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d x]\right)\text{Sec}[c+d x]\,dx$$

Optimal (type 3, 142 leaves, 5 steps):

$$\frac{2 a^{5/2} A\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{d}+\frac{2 a^3\left(35 A+32 B\right)\text{Sin}[c+d x]}{15 d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2 a^2\left(5 A+8 B\right)\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{15 d}+\frac{2 a B\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}\text{Sin}[c+d x]}{5 d}$$

Result (type 3, 1640 leaves):

$$-\left(\left(\left(\left(\frac{1}{16}-\frac{i}{16}\right)A\left(1+e^{i c}\right)\left(\sqrt{2}-(1-i)\,e^{\frac{i c}{2}}+(16-16 i)\,e^{\frac{3 i c}{2}+i d x}+(20+20 i)\sqrt{2}\,e^{2 i c+\frac{3 i d x}{2}}-(34-34 i)\,e^{\frac{5 i c}{2}+2 i d x}-(20+20 i)\sqrt{2}\,e^{3 i c+\frac{5 i d x}{2}}+(16-16 i)\,e^{\frac{7 i c}{2}+3 i d x}+(4+4 i)\sqrt{2}\,e^{4 i c+\frac{7 i d x}{2}}-(1-i)\,e^{\frac{9 i c}{2}+4 i d x}+8 i\,e^{\frac{1}{2} i (c+d x)}-16\sqrt{2}\,e^{i (c+d x)}-40 i\,e^{\frac{3}{2} i (c+d x)}+34\sqrt{2}\,e^{2 i (c+d x)}+40 i\,e^{\frac{5}{2} i (c+d x)}-16\sqrt{2}\,e^{3 i (c+d x)}-8 i\,e^{\frac{7}{2} i (c+d x)}+\sqrt{2}\,e^{4 i (c+d x)}-(4+4 i)\sqrt{2}\,e^{\frac{1}{2} i (2 c+d x)}\right)\times\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right)\Big/\left(\left(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i c}{2}}\right)\left(-1+e^{i c}\right)\left(i-2\sqrt{2}\,e^{\frac{1}{2} i (c+d x)}-4 i\,e^{i (c+d x)}+2\sqrt{2}\,e^{\frac{3}{2} i (c+d x)}+i\,e^{2 i (c+d x)}\right)^2\right)\right)-\frac{1}{4\sqrt{2}\,d}\,i A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5-$$

$$\frac{1}{4\sqrt{2}\,d}\,\mathrm{i}\,A\,\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]+\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\sqrt{2}\,\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}{\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]+\sqrt{2}\,\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}\Big]\,\big(a\,(1+\mathrm{Cos}[c+d\,x])\big)^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5-$$

$$\frac{1}{8\sqrt{2}\,d}A\,\big(a\,(1+\mathrm{Cos}[c+d\,x])\big)^{5/2}\,\mathrm{Log}\Big[2-\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5-$$

$$\frac{1}{8\sqrt{2}\,d}A\,\big(a\,(1+\mathrm{Cos}[c+d\,x])\big)^{5/2}\,\mathrm{Log}\Big[2+\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+$$

$$\frac{5\,(A+B)\,\mathrm{Cos}\big[\frac{d\,x}{2}\big]\,\big(a\,(1+\mathrm{Cos}[c+d\,x])\big)^{5/2}\,\mathrm{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]^5\,\mathrm{Sin}\big[\frac{c}{2}\big]}{4\,d}-$$

$$\left(\mathrm{i}\,A\,\mathrm{ArcTan}\Big[\frac{2\,\mathrm{i}\,\mathrm{Cos}\big[\frac{c}{2}\big]-\mathrm{i}\,\big(-\sqrt{2}+2\,\mathrm{Sin}\big[\frac{c}{2}\big]\big)\,\mathrm{Tan}\big[\frac{d\,x}{4}\big]}{\sqrt{-2+4\,\mathrm{Cos}\big[\frac{c}{2}\big]^2+4\,\mathrm{Sin}\big[\frac{c}{2}\big]^2}}\Big]\,\big(a\,(1+\mathrm{Cos}[c+d\,x])\big)^{5/2}\,\mathrm{Cot}\Big[\frac{c}{2}\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5\right)\Big/\left(2\,d\,\sqrt{-2+4\,\mathrm{Cos}\Big[\frac{c}{2}\Big]^2+4\,\mathrm{Sin}\Big[\frac{c}{2}\Big]^2}\right)+$$

$$\left(A\,\big(a\,(1+\mathrm{Cos}[c+d\,x])\big)^{5/2}\,\mathrm{Csc}\Big[\frac{c}{2}\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5\right.$$

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

$$\left.\left.\frac{4\,i\,\sqrt{2}\,\text{ArcTan}\left[\frac{2\,i\,\text{Cos}\left[\frac{c}{2}\right]-i\,\left(-\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\text{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right]\,\text{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Bigg/$$

$$\left(2\,\sqrt{2}\,d\,\left(4\,\text{Cos}\left[\frac{c}{2}\right]^2+4\,\text{Sin}\left[\frac{c}{2}\right]^2\right)\right)+$$

$$\frac{(2\,A+5\,B)\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Sin}\left[\frac{3\,c}{2}\right]}{24\,d}+$$

$$\frac{B\,\text{Cos}\left[\frac{5\,d\,x}{2}\right]\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Sin}\left[\frac{5\,c}{2}\right]}{40\,d}+$$

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

$$\frac{(2\,A+5\,B)\,\text{Cos}\left[\frac{3\,c}{2}\right]\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]}{24\,d}+$$

$$\frac{B\,\text{Cos}\left[\frac{5\,c}{2}\right]\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{40\,d}$$

Problem 95: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 144 leaves, 5 steps):

$$\frac{a^{5/2}\,(5\,A+2\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}+\frac{a^3\,(3\,A+14\,B)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-$$

$$\frac{a^2\,(3\,A-2\,B)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{a\,A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Tan}[c+d\,x]}{d}$$

Result (type 3, 460 leaves):

$$\frac{1}{96\,d}\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5$$
$$\left(-6\,i\,\sqrt{2}\,\left(5\,A+2\,B\right)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]-\right.$$
$$6\,i\,\sqrt{2}\,\left(5\,A+2\,B\right)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{4}\left(c+d\,x\right)\right]}\right]+$$
$$6\,\sqrt{2}\,\left(5\,A+2\,B\right)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]-$$
$$3\,\sqrt{2}\,\left(5\,A+2\,B\right)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]-$$
$$3\,\sqrt{2}\,\left(5\,A+2\,B\right)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right]+$$
$$24\,\left(2\,A+5\,B\right)\,\text{Cos}\left[\frac{d\,x}{2}\right]\,\text{Sin}\left[\frac{c}{2}\right]+8\,B\,\text{Cos}\left[\frac{3\,d\,x}{2}\right]\,\text{Sin}\left[\frac{3\,c}{2}\right]+$$
$$24\,\left(2\,A+5\,B\right)\,\text{Cos}\left[\frac{c}{2}\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+8\,B\,\text{Cos}\left[\frac{3\,c}{2}\right]\,\text{Sin}\left[\frac{3\,d\,x}{2}\right]+$$
$$\left.\frac{12\,A}{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}-\frac{12\,A}{\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}\right)$$

Problem 96: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 3, 156 leaves, 5 steps):

$$\frac{a^{5/2}\left(19\,A+20\,B\right)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d}-\frac{a^3\left(9\,A-4\,B\right)\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\left(7\,A+4\,B\right)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Tan}[c+d\,x]}{4\,d}+\frac{a\,A\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 605 leaves):

$$\frac{1}{128\,d}\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5$$
$$\left(-2\,i\sqrt{2}\,(19\,A+20\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]-\right.$$
$$2\,i\sqrt{2}\,(19\,A+20\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}(c+d\,x)\right]}\right]+$$
$$2\sqrt{2}\,(19\,A+20\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\sqrt{2}\,(19\,A+20\,B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]-$$
$$\sqrt{2}\,(19\,A+20\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right]+64\,B\,\text{Cos}\left[\frac{d\,x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]+$$
$$64\,B\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d\,x}{2}\right]+\frac{8\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}+$$
$$\frac{4\,(11\,A+4\,B)\,\text{Cos}\left[\frac{c}{2}\right]-4\,(9\,A+4\,B)\,\text{Sin}\left[\frac{c}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}+$$
$$\frac{8\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)^2}-$$
$$\left.\frac{4\left((11\,A+4\,B)\,\text{Cos}\left[\frac{c}{2}\right]+(9\,A+4\,B)\,\text{Sin}\left[\frac{c}{2}\right]\right)}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)}\right)$$

Problem 97: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 3, 164 leaves, 5 steps):

$$\frac{a^{5/2}\,(25\,A+38\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a^3\,(49\,A+54\,B)\,\text{Tan}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(3\,A+2\,B)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{4\,d}+$$
$$\frac{a\,A\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 3, 1132 leaves):

$$\frac{1}{64\sqrt{2}\,d}\,\mathrm{i}\,(-25A-38B)\,\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]-\sqrt{2}\,\mathrm{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]}{-\mathrm{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]+\sqrt{2}\,\mathrm{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]}\Big]$$

$$(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^5+\frac{1}{64\sqrt{2}\,d}\,\mathrm{i}\,(-25A-38B)$$

$$\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]+\mathrm{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]-\sqrt{2}\,\mathrm{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]}{\mathrm{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]+\sqrt{2}\,\mathrm{Cos}\big[\frac{c}{4}+\frac{dx}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{dx}{4}\big]}\Big]\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^5+$$

$$\frac{1}{64\sqrt{2}\,d}(25A+38B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\Big[\sqrt{2}+2\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^5+$$

$$\frac{1}{128\sqrt{2}\,d}(-25A-38B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}$$

$$\mathrm{Log}\Big[2-\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^5+\frac{1}{128\sqrt{2}\,d}$$

$$(-25A-38B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\Big[2+\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big]$$

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^5+\frac{A\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^5}{48\,d\,\big(\mathrm{Cos}\big[\frac{c}{2}+\frac{dx}{2}\big]-\mathrm{Sin}\big[\frac{c}{2}+\frac{dx}{2}\big]\big)^3}+$$

$$\frac{(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^5\,\big(5\,A\,\mathrm{Sin}\big[\frac{dx}{2}\big]+2\,B\,\mathrm{Sin}\big[\frac{dx}{2}\big]\big)}{32\,d\,\big(\mathrm{Cos}\big[\frac{c}{2}\big]-\mathrm{Sin}\big[\frac{c}{2}\big]\big)\,\big(\mathrm{Cos}\big[\frac{c}{2}+\frac{dx}{2}\big]-\mathrm{Sin}\big[\frac{c}{2}+\frac{dx}{2}\big]\big)^2}+\Big((a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}$$

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^5\,\Big(25\,A\,\mathrm{Cos}\Big[\frac{c}{2}\Big]+22\,B\,\mathrm{Cos}\Big[\frac{c}{2}\Big]-15\,A\,\mathrm{Sin}\Big[\frac{c}{2}\Big]-18\,B\,\mathrm{Sin}\Big[\frac{c}{2}\Big]\Big)\Big)\Big/$$

$$\Big(64\,d\,\Big(\mathrm{Cos}\Big[\frac{c}{2}\Big]-\mathrm{Sin}\Big[\frac{c}{2}\Big]\Big)\,\Big(\mathrm{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]-\mathrm{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big)\Big)-$$

$$\frac{A\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^5}{48\,d\,\big(\mathrm{Cos}\big[\frac{c}{2}+\frac{dx}{2}\big]+\mathrm{Sin}\big[\frac{c}{2}+\frac{dx}{2}\big]\big)^3}+$$

$$\frac{(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\big[\frac{c}{2}+\frac{dx}{2}\big]^5\,\big(5\,A\,\mathrm{Sin}\big[\frac{dx}{2}\big]+2\,B\,\mathrm{Sin}\big[\frac{dx}{2}\big]\big)}{32\,d\,\big(\mathrm{Cos}\big[\frac{c}{2}\big]+\mathrm{Sin}\big[\frac{c}{2}\big]\big)\,\big(\mathrm{Cos}\big[\frac{c}{2}+\frac{dx}{2}\big]+\mathrm{Sin}\big[\frac{c}{2}+\frac{dx}{2}\big]\big)^2}+$$

$$\Big((a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^5$$

$$\Big(-25\,A\,\mathrm{Cos}\Big[\frac{c}{2}\Big]-22\,B\,\mathrm{Cos}\Big[\frac{c}{2}\Big]-15\,A\,\mathrm{Sin}\Big[\frac{c}{2}\Big]-18\,B\,\mathrm{Sin}\Big[\frac{c}{2}\Big]\Big)\Big)\Big/$$

$$\Big(64\,d\,\Big(\mathrm{Cos}\Big[\frac{c}{2}\Big]+\mathrm{Sin}\Big[\frac{c}{2}\Big]\Big)\,\Big(\mathrm{Cos}\Big[\frac{c}{2}+\frac{dx}{2}\Big]+\mathrm{Sin}\Big[\frac{c}{2}+\frac{dx}{2}\Big]\Big)\Big)$$

Problem 98: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^5\,dx$$

Optimal (type 3, 209 leaves, 6 steps):

$$\frac{a^{5/2}\,(163\,A+200\,B)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{64\,d}+\frac{a^3\,(163\,A+200\,B)\,\mathrm{Tan}[c+d\,x]}{64\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{a^3\,(95\,A+104\,B)\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{96\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{a^2\,(11\,A+8\,B)\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]}{24\,d}+\frac{a\,A\,(a+a\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]}{4\,d}$$

Result (type 3, 1416 leaves):

$$\frac{1}{512\,\sqrt{2}\,d}\,i\,(-163\,A-200\,B)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{512\,\sqrt{2}\,d}\,i\,(-163\,A-200\,B)\,\mathrm{ArcTan}\left[\frac{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\mathrm{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{512\,\sqrt{2}\,d}\,(163\,A+200\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{1024\,\sqrt{2}\,d}\,(-163\,A-200\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\left[2-\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{1}{1024\,\sqrt{2}\,d}\,(-163\,A-200\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5+\frac{A\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{64\,d\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^4}+\left((a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(23\,A\,\mathrm{Cos}\left[\frac{c}{2}\right]+8\,B\,\mathrm{Cos}\left[\frac{c}{2}\right]-17\,A\,\mathrm{Sin}\left[\frac{c}{2}\right]-8\,B\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/\left(384\,d\,\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)^3\right)+$$

$$\frac{\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(43 A\,\text{Sin}\left[\frac{d x}{2}\right]+40 B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{256 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+\left(\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(163 A\,\text{Cos}\left[\frac{c}{2}\right]+200 B\,\text{Cos}\left[\frac{c}{2}\right]-77 A\,\text{Sin}\left[\frac{c}{2}\right]-120 B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(512 d\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)+$$
$$\frac{A\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\text{Sin}\left[\frac{d x}{2}\right]}{64 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^4}+$$
$$\left(\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(-23 A\,\text{Cos}\left[\frac{c}{2}\right]-8 B\,\text{Cos}\left[\frac{c}{2}\right]-17 A\,\text{Sin}\left[\frac{c}{2}\right]-8 B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(384 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^3\right)+$$
$$\frac{\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\left(43 A\,\text{Sin}\left[\frac{d x}{2}\right]+40 B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{256 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2}+$$
$$\left(\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right.$$
$$\left.\left(-163 A\,\text{Cos}\left[\frac{c}{2}\right]-200 B\,\text{Cos}\left[\frac{c}{2}\right]-77 A\,\text{Sin}\left[\frac{c}{2}\right]-120 B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(512 d\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 99: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d x]\right)\text{Sec}[c+d x]^6\,dx$$

Optimal (type 3, 254 leaves, 7 steps):

$$\frac{a^{5/2}\left(283 A+326 B\right)\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{128 d}+\frac{a^3\left(283 A+326 B\right)\text{Tan}[c+d x]}{128 d\sqrt{a+a\,\text{Cos}[c+d x]}}+$$
$$\frac{a^3\left(283 A+326 B\right)\text{Sec}[c+d x]\,\text{Tan}[c+d x]}{192 d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{a^3\left(157 A+170 B\right)\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]}{240 d\sqrt{a+a\,\text{Cos}[c+d x]}}+$$
$$\frac{a^2\left(13 A+10 B\right)\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]^3\,\text{Tan}[c+d x]}{40 d}+$$
$$\frac{a A\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}\text{Sec}[c+d x]^4\,\text{Tan}[c+d x]}{5 d}$$

Result (type 3, 759 leaves):

$$\frac{1}{1024\sqrt{2}\,d}\,\mathrm{i}\,(-283\,A-326\,B)\,\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\sqrt{2}\,\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}{-\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]+\sqrt{2}\,\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}\Big]$$

$$(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+\frac{1}{1024\sqrt{2}\,d}\,\mathrm{i}\,(-283\,A-326\,B)$$

$$\mathrm{ArcTan}\Big[\frac{\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]+\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\sqrt{2}\,\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}{\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]+\sqrt{2}\,\mathrm{Cos}\big[\frac{c}{4}+\frac{d\,x}{4}\big]-\mathrm{Sin}\big[\frac{c}{4}+\frac{d\,x}{4}\big]}\Big]\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+$$

$$\frac{1}{1024\sqrt{2}\,d}(283\,A+326\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\Big[\sqrt{2}+2\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+$$

$$\frac{1}{2048\sqrt{2}\,d}(-283\,A-326\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}$$

$$\mathrm{Log}\Big[2-\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+\frac{1}{2048\sqrt{2}\,d}$$

$$(-283\,A-326\,B)\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Log}\Big[2+\sqrt{2}\,\mathrm{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]-\sqrt{2}\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]\Big]$$

$$\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5+\frac{1}{122\,880\,d}\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\,\mathrm{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5\,\mathrm{Sec}[c+d\,x]^5$$

$$\Big(21\,610\,A\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]+20\,660\,B\,\mathrm{Sin}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]+2080\,A\,\mathrm{Sin}\Big[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\Big]-$$

$$3520\,B\,\mathrm{Sin}\Big[\frac{3\,c}{2}+\frac{3\,d\,x}{2}\Big]+20\,376\,A\,\mathrm{Sin}\Big[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\Big]+20\,400\,B\,\mathrm{Sin}\Big[\frac{5\,c}{2}+\frac{5\,d\,x}{2}\Big]+1415\,A$$

$$\mathrm{Sin}\Big[\frac{7\,c}{2}+\frac{7\,d\,x}{2}\Big]+1630\,B\,\mathrm{Sin}\Big[\frac{7\,c}{2}+\frac{7\,d\,x}{2}\Big]+4245\,A\,\mathrm{Sin}\Big[\frac{9\,c}{2}+\frac{9\,d\,x}{2}\Big]+4890\,B\,\mathrm{Sin}\Big[\frac{9\,c}{2}+\frac{9\,d\,x}{2}\Big]\Big)$$

Problem 104: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\,dx$$

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

$$\frac{2\,A\,\mathrm{ArcTanh}\Big[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\Big]}{\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B)\,\mathrm{ArcTanh}\Big[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\Big]}{\sqrt{a}\,d}$$

Result (type 3, 1682 leaves):

$$-\Big(\Big(\Big(\Big(\frac{1}{2}-\frac{\mathrm{i}}{2}\Big)\,A\,\big(1+e^{\mathrm{i}\,c}\big)$$

$$\Big(\sqrt{2}-(1-\mathrm{i})\,e^{\frac{\mathrm{i}\,c}{2}}+(16-16\,\mathrm{i})\,e^{\frac{3\,\mathrm{i}\,c}{2}+\mathrm{i}\,d\,x}+(20+20\,\mathrm{i})\,\sqrt{2}\,e^{2\,\mathrm{i}\,c+\frac{3\,\mathrm{i}\,d\,x}{2}}-(34-34\,\mathrm{i})\,e^{\frac{5\,\mathrm{i}\,c}{2}+2\,\mathrm{i}\,d\,x}-$$

$$(20+20\,\mathrm{i})\,\sqrt{2}\,e^{3\,\mathrm{i}\,c+\frac{5\,\mathrm{i}\,d\,x}{2}}+(16-16\,\mathrm{i})\,e^{\frac{7\,\mathrm{i}\,c}{2}+3\,\mathrm{i}\,d\,x}+(4+4\,\mathrm{i})\,\sqrt{2}\,e^{4\,\mathrm{i}\,c+\frac{7\,\mathrm{i}\,d\,x}{2}}-$$

$$(1-\mathrm{i})\,e^{\frac{9\,\mathrm{i}\,c}{2}+4\,\mathrm{i}\,d\,x}+8\,\mathrm{i}\,e^{\frac{1}{2}\mathrm{i}\,(c+d\,x)}-16\,\sqrt{2}\,e^{\mathrm{i}\,(c+d\,x)}-40\,\mathrm{i}\,e^{\frac{3}{2}\mathrm{i}\,(c+d\,x)}+34\,\sqrt{2}\,e^{2\,\mathrm{i}\,(c+d\,x)}+$$

$$40\,\mathrm{i}\,e^{\frac{5}{2}\mathrm{i}\,(c+d\,x)}-16\,\sqrt{2}\,e^{3\,\mathrm{i}\,(c+d\,x)}-8\,\mathrm{i}\,e^{\frac{7}{2}\mathrm{i}\,(c+d\,x)}+\sqrt{2}\,e^{4\,\mathrm{i}\,(c+d\,x)}-(4+4\,\mathrm{i})\,\sqrt{2}\,e^{\frac{1}{2}\mathrm{i}\,(2\,c+d\,x)}\Big)$$

$$x \cos\left[\frac{c}{2}+\frac{d x}{2}\right] \cos[c+d x] \left(B+A \sec[c+d x]\right)\Bigg) \Bigg/ \Bigg(\Bigg(\left(\left(-1-i\right)+\sqrt{2}\, e^{\frac{i c}{2}}\right)$$

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

$$\sqrt{a \left(1+\cos[c+d x]\right)} \left(A+B \cos[c+d x]\right)\Bigg)\Bigg) -$$

$$\Bigg(i \sqrt{2}\, A \operatorname{ArcTan}\left[\frac{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2} \sin\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2} \cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]$$

$$\cos\left[\frac{c}{2}+\frac{d x}{2}\right] \cos[c+d x] \left(B+A \sec[c+d x]\right)\Bigg) \Bigg/$$

$$\left(d \sqrt{a \left(1+\cos[c+d x]\right)} \left(A+B \cos[c+d x]\right)\right) -$$

$$\Bigg(i \sqrt{2}\, A \operatorname{ArcTan}\left[\frac{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sin\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2} \sin\left[\frac{c}{4}+\frac{d x}{4}\right]}{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2} \cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}\right]$$

$$\cos\left[\frac{c}{2}+\frac{d x}{2}\right] \cos[c+d x] \left(B+A \sec[c+d x]\right)\Bigg) \Bigg/$$

$$\left(d \sqrt{a \left(1+\cos[c+d x]\right)} \left(A+B \cos[c+d x]\right)\right) +$$

$$\left(2 (A-B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right] \cos[c+d x] \operatorname{Log}\left[\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]\right] \left(B+A \sec[c+d x]\right)\right) \Big/$$

$$\left(d \sqrt{a \left(1+\cos[c+d x]\right)} \left(A+B \cos[c+d x]\right)\right) -$$

$$\left(2 (A-B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right] \cos[c+d x] \operatorname{Log}\left[\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sin\left[\frac{c}{4}+\frac{d x}{4}\right]\right] \left(B+A \sec[c+d x]\right)\right) \Big/$$

$$\left(d \sqrt{a \left(1+\cos[c+d x]\right)} \left(A+B \cos[c+d x]\right)\right) -$$

$$\left(A \cos\left[\frac{c}{2}+\frac{d x}{2}\right] \cos[c+d x] \operatorname{Log}\left[2-\sqrt{2} \cos\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2} \sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(B+A \sec[c+d x]\right)\right) \Big/$$

$$\left(\sqrt{2}\, d \sqrt{a \left(1+\cos[c+d x]\right)} \left(A+B \cos[c+d x]\right)\right) -$$

$$\left(A \cos\left[\frac{c}{2}+\frac{d x}{2}\right] \cos[c+d x] \operatorname{Log}\left[2+\sqrt{2} \cos\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2} \sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(B+A \sec[c+d x]\right)\right) \Big/$$

$$\left(\sqrt{2}\, d \sqrt{a \left(1+\cos[c+d x]\right)} \left(A+B \cos[c+d x]\right)\right) -$$

$$\Bigg(4 i A \operatorname{ArcTan}\left[\frac{2 i \cos\left[\frac{c}{2}\right]-i \left(-\sqrt{2}+2 \sin\left[\frac{c}{2}\right]\right) \tan\left[\frac{d x}{4}\right]}{\sqrt{-2+4 \cos\left[\frac{c}{2}\right]^2+4 \sin\left[\frac{c}{2}\right]^2}}\right]$$

$$\cos\left[\frac{c}{2}+\frac{d x}{2}\right] \cos[c+d x] \cot\left[\frac{c}{2}\right] \left(B+A \sec[c+d x]\right)\Bigg) \Bigg/$$

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

$$\left(2\sqrt{2}\;A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{c}{2}\right](B+A\,\mathrm{Sec}[c+d\,x])\right.$$

$$\left(-d\,x\,\mathrm{Cos}\left[\frac{c}{2}\right]+2\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]+2\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right]\mathrm{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4\,i\sqrt{2}\;\mathrm{ArcTan}\left[\frac{2\,i\,\mathrm{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\mathrm{Tan}\left[\frac{d\,x}{4}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right]\mathrm{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

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

Problem 105: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^2}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 119 leaves, 6 steps):

$$-\frac{(A-2\,B)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\;\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{\sqrt{a}\;d}+\frac{\sqrt{2}\;(A-B)\,\mathrm{ArcTanh}\left[\frac{\sqrt{a}\;\mathrm{Sin}[c+d\,x]}{\sqrt{2}\;\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{\sqrt{a}\;d}+\frac{A\,\mathrm{Tan}[c+d\,x]}{d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 532 leaves):

$$\frac{1}{4\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(-8\,(A-B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]+8\,(A-B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]-2\,\sqrt{2}\,(A-2\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]-\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}2\,i\,(A-2\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)-\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}2\,i\,(A-2\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)-\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}(A-2\,B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)-\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}(A-2\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+\frac{4\,A}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}-\frac{4\,A}{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}\right)$$

Problem 106: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^3}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 165 leaves, 7 steps):

$$\frac{(7\,A-4\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,\sqrt{a}\,d}-\frac{\sqrt{2}\,(A-B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}-\frac{(A-4\,B)\,\text{Tan}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 724 leaves):

$$\frac{1}{16\,d\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg(32\,(A-B)\,\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]-32\,(A-B)$$

$$\text{Log}\left[\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]\right]+2\,\sqrt{2}\,(7\,A-4\,B)\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]+$$

$$\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}2\,i\,(7\,A-4\,B)\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(-1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]$$

$$\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}2\,i\,(7\,A-4\,B)$$

$$\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\left(1+\sqrt{2}\right)\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}{\left(-1+\sqrt{2}\right)\text{Cos}\left[\frac{1}{4}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{4}\,(c+d\,x)\right]}\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}$$

$$(7\,A-4\,B)\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+$$

$$\frac{1}{-1+\sqrt{2}\,\text{Sin}\left[\frac{c}{2}\right]}(7\,A-4\,B)\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\sqrt{2}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right]$$

$$\left(\sqrt{2}-2\,\text{Sin}\left[\frac{c}{2}\right]\right)+\frac{8\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]-\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}-$$

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

$$\frac{8\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)^2}+$$

$$\frac{4\left((A-4\,B)\,\text{Cos}\left[\frac{c}{2}\right]+(3\,A-4\,B)\,\text{Sin}\left[\frac{c}{2}\right]\right)}{\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]+\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)}\Bigg)$$

Problem 107: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^4\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}\,dx$$

Optimal (type 3, 261 leaves, 8 steps):

$$-\frac{(15A-19B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}+\frac{(A-B)\,\text{Cos}[c+dx]^4\,\text{Sin}[c+dx]}{2d\,(a+a\,\text{Cos}[c+dx])^{3/2}}+\frac{(651A-799B)\,\text{Sin}[c+dx]}{105\,a\,d\,\sqrt{a+a\,\text{Cos}[c+dx]}}+\frac{(63A-67B)\,\text{Cos}[c+dx]^2\,\text{Sin}[c+dx]}{70\,a\,d\,\sqrt{a+a\,\text{Cos}[c+dx]}}-\frac{(7A-11B)\,\text{Cos}[c+dx]^3\,\text{Sin}[c+dx]}{14\,a\,d\,\sqrt{a+a\,\text{Cos}[c+dx]}}-\frac{(273A-397B)\,\sqrt{a+a\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{210\,a^2\,d}$$

Result (type 3, 713 leaves):

$$\frac{(15A-19B)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]\right]}{d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}+\frac{(-15A+19B)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]\right]}{d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}+$$

$$\frac{5\,(4A-5B)\,\text{Cos}\left[\frac{dx}{2}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{c}{2}\right]}{d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}-\frac{(6A-11B)\,\text{Cos}\left[\frac{3dx}{2}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{3c}{2}\right]}{3d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}+$$

$$\frac{(2A-3B)\,\text{Cos}\left[\frac{5dx}{2}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{5c}{2}\right]}{5d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}+\frac{B\,\text{Cos}\left[\frac{7dx}{2}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{7c}{2}\right]}{7d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}+$$

$$\frac{5\,(4A-5B)\,\text{Cos}\left[\frac{c}{2}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{dx}{2}\right]}{d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}-\frac{(6A-11B)\,\text{Cos}\left[\frac{3c}{2}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{3dx}{2}\right]}{3d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}+$$

$$\frac{(2A-3B)\,\text{Cos}\left[\frac{5c}{2}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{5dx}{2}\right]}{5d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}+\frac{B\,\text{Cos}\left[\frac{7c}{2}\right]\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\,\text{Sin}\left[\frac{7dx}{2}\right]}{7d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}}+$$

$$\frac{(A-B)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3}{2d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\left(\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]\right)^2}+\frac{(-A+B)\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^3}{2d\,(a\,(1+\text{Cos}[c+dx]))^{3/2}\left(\text{Cos}\left[\frac{c}{4}+\frac{dx}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{dx}{4}\right]\right)^2}$$

Problem 112: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(A+B\,\text{Cos}[c+dx])\,\text{Sec}[c+dx]}{(a+a\,\text{Cos}[c+dx])^{3/2}}\,dx$$

Optimal (type 3, 127 leaves, 6 steps):

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

Result (type 3, 2128 leaves):

$$-\left(\left(\left(1-i\right)A\left(1+e^{i\,c}\right)\left(\sqrt{2}-\left(1-i\right)e^{\frac{i\,c}{2}}+\left(16-16\,i\right)e^{\frac{3\,i\,c}{2}+i\,d\,x}+\left(20+20\,i\right)\sqrt{2}\,e^{2\,i\,c+\frac{3\,i\,d\,x}{2}}-\left(34-34\,i\right)e^{\frac{5\,i\,c}{2}+2\,i\,d\,x}-\left(20+20\,i\right)\sqrt{2}\,e^{3\,i\,c+\frac{5\,i\,d\,x}{2}}+\left(16-16\,i\right)e^{\frac{7\,i\,c}{2}+3\,i\,d\,x}+\left(4+4\,i\right)\sqrt{2}\,e^{4\,i\,c+\frac{7\,i\,d\,x}{2}}-\left(1-i\right)e^{\frac{9\,i\,c}{2}+4\,i\,d\,x}+8\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{i\,(c+d\,x)}-40\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}+34\,\sqrt{2}\,e^{2\,i\,(c+d\,x)}+40\,i\,e^{\frac{5}{2}\,i\,(c+d\,x)}-16\,\sqrt{2}\,e^{3\,i\,(c+d\,x)}-8\,i\,e^{\frac{7}{2}\,i\,(c+d\,x)}+\sqrt{2}\,e^{4\,i\,(c+d\,x)}-\left(4+4\,i\right)\sqrt{2}\,e^{\frac{1}{2}\,i\,(2\,c+d\,x)}\right)\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Cos}[c+d\,x]\,(B+A\,\text{Sec}[c+d\,x])\right)\Big/\left(\left(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i\,c}{2}}\right)\left(-1+e^{i\,c}\right)\left(i-2\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}-4\,i\,e^{i\,(c+d\,x)}+2\,\sqrt{2}\,e^{\frac{3}{2}\,i\,(c+d\,x)}+i\,e^{2\,i\,(c+d\,x)}\right)^2\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}(A+B\,\text{Cos}[c+d\,x])\right)\right)-$$

$$\left(2\,i\,\sqrt{2}\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Cos}[c+d\,x]\,(B+A\,\text{Sec}[c+d\,x])\right)\Big/\left(d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}(A+B\,\text{Cos}[c+d\,x])\right)+$$

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

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

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

$$\left(\left(1-i\right)\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\text{Cos}[c+d\,x]\,(B+A\,\text{Sec}[c+d\,x])\left(\left(1+i\right)\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}\right]-\left(1-i\right)\text{Sin}\left[\frac{c}{4}\right]-i\,\sqrt{2}\,\text{Sin}\left[\frac{c}{4}\right]\right)\left(\left(-1-i\right)A\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{4}\right]+\left(1-i\right)A\,\text{Sin}\left[\frac{c}{4}\right]-i\,\sqrt{2}\,A\,\text{Sin}\left[\frac{c}{4}\right]\right)\right)\Big/\left(\sqrt{2}\,d\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}(A+B\,\text{Cos}[c+d\,x])\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\right)-$$

$$\left(\left(\frac{1}{2}+\frac{i}{2}\right)\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \mathrm{Cos}[c+d x]\,\mathrm{Log}\left[2+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$

$$(B+A\,\mathrm{Sec}[c+d x])\left((1+i)\,\mathrm{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,\mathrm{Cos}\left[\frac{c}{4}\right]-(1-i)\,\mathrm{Sin}\left[\frac{c}{4}\right]-i\sqrt{2}\,\mathrm{Sin}\left[\frac{c}{4}\right]\right)$$

$$\left.\left((-1-i)\,A\,\mathrm{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,A\,\mathrm{Cos}\left[\frac{c}{4}\right]+(1-i)\,A\,\mathrm{Sin}\left[\frac{c}{4}\right]-i\sqrt{2}\,A\,\mathrm{Sin}\left[\frac{c}{4}\right]\right)\right)\Big/$$

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

$$\left(8\,i\,A\,\mathrm{ArcTan}\left[\frac{2\,i\,\mathrm{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\mathrm{Tan}\left[\frac{d x}{4}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right]\right.$$

$$\left.\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\mathrm{Cos}[c+d x]\,\mathrm{Cot}\left[\frac{c}{2}\right]\,(B+A\,\mathrm{Sec}[c+d x])\right)\Big/$$

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

$$\left(4\sqrt{2}\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{c}{2}\right]\,(B+A\,\mathrm{Sec}[c+d x])\right.$$

$$\left(-d x\,\mathrm{Cos}\left[\frac{c}{2}\right]+2\,\mathrm{Log}\left[\sqrt{2}+2\,\mathrm{Cos}\left[\frac{d x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]+2\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d x}{2}\right]\right]\mathrm{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4\,i\sqrt{2}\,\mathrm{ArcTan}\left[\frac{2\,i\,\mathrm{Cos}\left[\frac{c}{2}\right]-i\left(-\sqrt{2}+2\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\mathrm{Tan}\left[\frac{d x}{4}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right]\mathrm{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4\,\mathrm{Cos}\left[\frac{c}{2}\right]^2+4\,\mathrm{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

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

$$\left((-A+B)\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\mathrm{Cos}[c+d x]\,(B+A\,\mathrm{Sec}[c+d x])\right)\Big/$$

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

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

Problem 113: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^2}{\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}\, dx$$

Optimal (type 3, 170 leaves, 7 steps):

$$-\frac{(3\,A-2\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{a^{3/2}\,d}+\frac{(9\,A-5\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B)\,\text{Tan}[c+d\,x]}{2\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}+\frac{(3\,A-B)\,\text{Tan}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 1058 leaves):

$$\frac{(-9 A+5 B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \log\left[\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]\right]}{d\,(a\,(1+\cos[c+d x]))^{3/2}}+$$

$$\frac{(9 A-5 B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \log\left[\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sin\left[\frac{c}{4}+\frac{d x}{4}\right]\right]}{d\,(a\,(1+\cos[c+d x]))^{3/2}}-$$

$$\frac{\sqrt{2}\,(3 A-2 B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \log\left[\sqrt{2}+2 \sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{d\,(a\,(1+\cos[c+d x]))^{3/2}}-$$

$$\left(\mathrm{i}\,(3 A-2 B) \operatorname{ArcTan}\left[\frac{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2} \sin\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2} \cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}\right] \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3\right.$$
$$\left.\left(\sqrt{2}-2 \sin\left[\frac{c}{2}\right]\right)\right) \Big/ \left(d\,(a\,(1+\cos[c+d x]))^{3/2} \left(-1+\sqrt{2} \sin\left[\frac{c}{2}\right]\right)\right)-$$

$$\left(\mathrm{i}\,(3 A-2 B) \operatorname{ArcTan}\left[\frac{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sin\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2} \sin\left[\frac{c}{4}+\frac{d x}{4}\right]}{\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2} \cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]}\right] \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3\right.$$
$$\left.\left(\sqrt{2}-2 \sin\left[\frac{c}{2}\right]\right)\right) \Big/ \left(d\,(a\,(1+\cos[c+d x]))^{3/2} \left(-1+\sqrt{2} \sin\left[\frac{c}{2}\right]\right)\right)-$$

$$\left((3 A-2 B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \log\left[2-\sqrt{2} \cos\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2} \sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(\sqrt{2}-2 \sin\left[\frac{c}{2}\right]\right)\right) \Big/$$
$$\left(2 d\,(a\,(1+\cos[c+d x]))^{3/2} \left(-1+\sqrt{2} \sin\left[\frac{c}{2}\right]\right)\right)-$$

$$\left((3 A-2 B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \log\left[2+\sqrt{2} \cos\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2} \sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right] \left(\sqrt{2}-2 \sin\left[\frac{c}{2}\right]\right)\right) \Big/$$
$$\left(2 d\,(a\,(1+\cos[c+d x]))^{3/2} \left(-1+\sqrt{2} \sin\left[\frac{c}{2}\right]\right)\right)+$$

$$\frac{(A-B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{2 d\,(a\,(1+\cos[c+d x]))^{3/2} \left(\cos\left[\frac{c}{4}+\frac{d x}{4}\right]-\sin\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2}+$$

$$\frac{(-A+B) \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{2 d\,(a\,(1+\cos[c+d x]))^{3/2} \left(\cos\left[\frac{c}{4}+\frac{d x}{4}\right]+\sin\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2}+$$

$$\frac{2 A \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{d\,(a\,(1+\cos[c+d x]))^{3/2} \left(\cos\left[\frac{c}{2}+\frac{d x}{2}\right]-\sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}-$$

$$\frac{2 A \cos\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{d\,(a\,(1+\cos[c+d x]))^{3/2} \left(\cos\left[\frac{c}{2}+\frac{d x}{2}\right]+\sin\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}$$

Problem 114: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 221 leaves, 8 steps):

$$\frac{(19\,A-12\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,a^{3/2}\,d}-\frac{(13\,A-9\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{(7\,A-6\,B)\,\text{Tan}[c+d\,x]}{4\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(A-B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(2\,A-B)\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 1402 leaves):

$$\frac{(13\,A-9\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]}{d\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}}+$$

$$\frac{(-13\,A+9\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]}{d\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}}+$$

$$\frac{(19\,A-12\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Log}\left[\sqrt{2}+2\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]}{2\,\sqrt{2}\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}}+$$

$$\left(i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(19\,\sqrt{2}\,A-12\,\sqrt{2}\,B-38\,A\,\text{Sin}\left[\frac{c}{2}\right]+24\,B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

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

$$\left(i\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(19\,\sqrt{2}\,A-12\,\sqrt{2}\,B-38\,A\,\text{Sin}\left[\frac{c}{2}\right]+24\,B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\right.$$

$$\left.\left(19\,\sqrt{2}\,A-12\,\sqrt{2}\,B-38\,A\,\text{Sin}\left[\frac{c}{2}\right]+24\,B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \text{Log}\left[2+\sqrt{2}\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2}\ \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\right.$$
$$\left.\left(19\sqrt{2}\ A-12\sqrt{2}\ B-38\,A\,\text{Sin}\left[\frac{c}{2}\right]+24\,B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(8\,d\,\left(a\,\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(-1+\sqrt{2}\ \text{Sin}\left[\frac{c}{2}\right]\right)\right)+$$
$$\frac{(-A+B)\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{2\,d\,\left(a\,\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2}+$$
$$\frac{(A-B)\ \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3}{2\,d\,\left(a\,\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2}+$$
$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \text{Sin}\left[\frac{d x}{2}\right]\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(-5\,A\,\text{Cos}\left[\frac{c}{2}\right]+4\,B\,\text{Cos}\left[\frac{c}{2}\right]+7\,A\,\text{Sin}\left[\frac{c}{2}\right]-4\,B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(2\,d\,\left(a\,\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{Cos}\left[\frac{c}{2}\right]-\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)+$$
$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \text{Sin}\left[\frac{d x}{2}\right]\right)\Big/$$
$$\left(d\,\left(a\,\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(5\,A\,\text{Cos}\left[\frac{c}{2}\right]-4\,B\,\text{Cos}\left[\frac{c}{2}\right]+7\,A\,\text{Sin}\left[\frac{c}{2}\right]-4\,B\,\text{Sin}\left[\frac{c}{2}\right]\right)\right)\Big/$$
$$\left(2\,d\,\left(a\,\left(1+\text{Cos}[c+d x]\right)\right)^{3/2}\left(\text{Cos}\left[\frac{c}{2}\right]+\text{Sin}\left[\frac{c}{2}\right]\right)\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]+\text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)\right)$$

Problem 120: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(A+B\,\text{Cos}[c+d x]\right)\ \text{Sec}[c+d x]}{\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}}\,dx$$

Optimal (type 3, 164 leaves, 7 steps):

$$\frac{2\,A\,\text{ArcTanh}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{a^{5/2}\,d}-\frac{(43\,A-3\,B)\ \text{ArcTanh}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{2}\ \sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{16\sqrt{2}\ a^{5/2}\,d}-$$
$$\frac{(A-B)\ \text{Sin}[c+d x]}{4\,d\,\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}}-\frac{(11\,A-3\,B)\ \text{Sin}[c+d x]}{16\,a\,d\,\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}}$$

Result (type 3, 2334 leaves):

$$-\left(\left(\left((2-2\,i)\ A\ \left(1+e^{i c}\right)\right.\right.\right.$$
$$\left(\sqrt{2}-(1-i)\ e^{\frac{i c}{2}}+(16-16\,i)\ e^{\frac{3 i c}{2}+i d x}+(20+20\,i)\sqrt{2}\ e^{2 i c+\frac{3 i d x}{2}}-(34-34\,i)\ e^{\frac{5 i c}{2}+2 i d x}-\right.$$

$$\left(20+20\,i\right)\sqrt{2}\,e^{3\,i\,c+\frac{5\,i\,d\,x}{2}}+\left(16-16\,i\right)e^{\frac{7\,i\,c}{2}+3\,i\,d\,x}+\left(4+4\,i\right)\sqrt{2}\,e^{4\,i\,c+\frac{7\,i\,d\,x}{2}}-$$

$$\left(1-i\right)e^{\frac{9\,i\,c}{2}+4\,i\,d\,x}+8\,i\,e^{\frac{1}{2}\,i\,(c+d\,x)}-16\sqrt{2}\,e^{i\,(c+d\,x)}-40\,i\,e^{\frac{3}{2}\,i\,(c+d\,x)}+34\sqrt{2}\,e^{2\,i\,(c+d\,x)}+$$

$$40\,i\,e^{\frac{5}{2}\,i\,(c+d\,x)}-16\sqrt{2}\,e^{3\,i\,(c+d\,x)}-8\,i\,e^{\frac{7}{2}\,i\,(c+d\,x)}+\sqrt{2}\,e^{4\,i\,(c+d\,x)}-\left(4+4\,i\right)\sqrt{2}\,e^{\frac{1}{2}\,i\,(2\,c+d\,x)}\Big)$$

$$x\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\,\left(B+A\,\text{Sec}[c+d\,x]\right)\Big)\Big/\left(\left(\left(\left(-1-i\right)+\sqrt{2}\,e^{\frac{i\,c}{2}}\right)\right.\right.$$

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

$$\left.\left.\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\right)\right)-$$

$$\left(4\,i\sqrt{2}\,A\,\text{ArcTan}\left[\frac{\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}{-\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]}\right]\right.$$

$$\left.\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\,\left(B+A\,\text{Sec}[c+d\,x]\right)\right)\Big/$$

$$\left(d\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\right)+$$

$$\left(\left(43\,A-3\,B\right)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\right.$$

$$\left.\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]-\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\,\left(B+A\,\text{Sec}[c+d\,x]\right)\right)\Big/$$

$$\left(4\,d\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\right)+$$

$$\left(\left(-43\,A+3\,B\right)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\,\text{Log}\left[\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right]\,\left(B+A\,\text{Sec}[c+d\,x]\right)\right)\Big/$$

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

$$\left(2\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\right.$$

$$\left.\text{Log}\left[2-\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\,\left(B+A\,\text{Sec}[c+d\,x]\right)\right)\Big/$$

$$\left(d\left(a\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\right)+$$

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

$$\left(B+A\,\text{Sec}[c+d\,x]\right)\left(\left(1+i\right)\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}\right]-\left(1-i\right)\,\text{Sin}\left[\frac{c}{4}\right]-i\sqrt{2}\,\text{Sin}\left[\frac{c}{4}\right]\right)$$

$$\left.\left(\left(-1-i\right)\,A\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,A\,\text{Cos}\left[\frac{c}{4}\right]+\left(1-i\right)\,A\,\text{Sin}\left[\frac{c}{4}\right]-i\sqrt{2}\,A\,\text{Sin}\left[\frac{c}{4}\right]\right)\right)\Big/$$

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

$$\left(\left(1+i\right)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\text{Cos}[c+d\,x]\,\text{Log}\left[2+\sqrt{2}\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-\sqrt{2}\,\text{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right]\right.$$

$$\left(B+A\,\text{Sec}[c+d\,x]\right)\left(\left(1+i\right)\,\text{Cos}\left[\frac{c}{4}\right]+\sqrt{2}\,\text{Cos}\left[\frac{c}{4}\right]-\left(1-i\right)\,\text{Sin}\left[\frac{c}{4}\right]-i\sqrt{2}\,\text{Sin}\left[\frac{c}{4}\right]\right)$$

$$\left(\left(-1-i\right) A \operatorname{Cos}\left[\frac{c}{4}\right]+\sqrt{2} A \operatorname{Cos}\left[\frac{c}{4}\right]+\left(1-i\right) A \operatorname{Sin}\left[\frac{c}{4}\right]-i \sqrt{2} A \operatorname{Sin}\left[\frac{c}{4}\right]\right)\right)\Big/$$

$$\left(\sqrt{2}\, d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2} \left(A+B \operatorname{Cos}[c+d x]\right) \left(\operatorname{Cos}\left[\frac{c}{2}\right]+\operatorname{Sin}\left[\frac{c}{2}\right]\right)\right)-$$

$$\left(16 i A \operatorname{ArcTan}\left[\frac{2 i \operatorname{Cos}\left[\frac{c}{2}\right]-i \left(-\sqrt{2}+2 \operatorname{Sin}\left[\frac{c}{2}\right]\right) \operatorname{Tan}\left[\frac{d x}{4}\right]}{\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}}\right]\right.$$

$$\left.\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Cos}[c+d x] \operatorname{Cot}\left[\frac{c}{2}\right] \left(B+A \operatorname{Sec}[c+d x]\right)\right)\Big/$$

$$\left(d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2} \left(A+B \operatorname{Cos}[c+d x]\right) \sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}\right)+$$

$$\left(8 \sqrt{2} A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{c}{2}\right] \left(B+A \operatorname{Sec}[c+d x]\right)\right.$$

$$\left(-d x \operatorname{Cos}\left[\frac{c}{2}\right]+2 \operatorname{Log}\left[\sqrt{2}+2 \operatorname{Cos}\left[\frac{d x}{2}\right] \operatorname{Sin}\left[\frac{c}{2}\right]+2 \operatorname{Cos}\left[\frac{c}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]\right] \operatorname{Sin}\left[\frac{c}{2}\right]+\right.$$

$$\left.\left.\frac{4 i \sqrt{2} \operatorname{ArcTan}\left[\frac{2 i \operatorname{Cos}\left[\frac{c}{2}\right]-i \left(-\sqrt{2}+2 \operatorname{Sin}\left[\frac{c}{2}\right]\right) \operatorname{Tan}\left[\frac{d x}{4}\right]}{\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}}\right] \operatorname{Cos}\left[\frac{c}{2}\right]}{\sqrt{-2+4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2}}\right)\right)\Big/$$

$$\left(d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2} \left(A+B \operatorname{Cos}[c+d x]\right) \left(4 \operatorname{Cos}\left[\frac{c}{2}\right]^2+4 \operatorname{Sin}\left[\frac{c}{2}\right]^2\right)\right)+$$

$$\left(\left(-A+B\right) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Cos}[c+d x] \left(B+A \operatorname{Sec}[c+d x]\right)\right)\Big/$$

$$\left(8 d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2} \left(A+B \operatorname{Cos}[c+d x]\right) \left(\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^4\right)+$$

$$\left(\left(-11 A+3 B\right) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Cos}[c+d x] \left(B+A \operatorname{Sec}[c+d x]\right)\right)\Big/$$

$$\left(8 d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{5/2} \left(A+B \operatorname{Cos}[c+d x]\right) \left(\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right)^2\right)+$$

$$\left((A-B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Cos}[c+d\,x]\,(B+A\,\text{Sec}[c+d\,x])\right)\Big/$$
$$\left(8\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(A+B\,\text{Cos}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right)^4\right)+$$
$$\left((11\,A-3\,B)\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\text{Cos}[c+d\,x]\,(B+A\,\text{Sec}[c+d\,x])\right)\Big/$$
$$\left(8\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,(A+B\,\text{Cos}[c+d\,x])\,\left(\text{Cos}\left[\frac{c}{4}+\frac{d\,x}{4}\right]+\text{Sin}\left[\frac{c}{4}+\frac{d\,x}{4}\right]\right)^2\right)$$

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

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

Optimal (type 3, 207 leaves, 8 steps):

$$-\frac{(5\,A-2\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{a^{5/2}\,d}+\frac{(115\,A-43\,B)\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-$$
$$\frac{(A-B)\,\text{Tan}[c+d\,x]}{4\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}-\frac{(15\,A-7\,B)\,\text{Tan}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(35\,A-11\,B)\,\text{Tan}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 632 leaves):

$$\frac{1}{32\, d\, \left(a\, \left(1+\text{Cos}[c+d\, x]\right)\right)^{5/2}}$$
$$\text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]\, \left(8\, (-115\, A+43\, B)\, \text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]^4\, \text{Log}\left[\text{Cos}\left[\frac{1}{4}\, (c+d\, x)\right]-\text{Sin}\left[\frac{1}{4}\, (c+d\, x)\right]\right]+\right.$$
$$8\, (115\, A-43\, B)\, \text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]^4\, \text{Log}\left[\text{Cos}\left[\frac{1}{4}\, (c+d\, x)\right]+\text{Sin}\left[\frac{1}{4}\, (c+d\, x)\right]\right]-$$
$$64\, \sqrt{2}\, (5\, A-2\, B)\, \text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]^4\, \text{Log}\left[\sqrt{2}+2\, \text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right]-\frac{1}{-1+\sqrt{2}\, \text{Sin}\left[\frac{c}{2}\right]}$$
$$64\, i\, (5\, A-2\, B)\, \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\, (c+d\, x)\right]-\left(-1+\sqrt{2}\right)\, \text{Sin}\left[\frac{1}{4}\, (c+d\, x)\right]}{\left(1+\sqrt{2}\right)\, \text{Cos}\left[\frac{1}{4}\, (c+d\, x)\right]-\text{Sin}\left[\frac{1}{4}\, (c+d\, x)\right]}\right]$$
$$\text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]^4\, \left(\sqrt{2}-2\, \text{Sin}\left[\frac{c}{2}\right]\right)-\frac{1}{-1+\sqrt{2}\, \text{Sin}\left[\frac{c}{2}\right]}$$
$$64\, i\, (5\, A-2\, B)\, \text{ArcTan}\left[\frac{\text{Cos}\left[\frac{1}{4}\, (c+d\, x)\right]-\left(1+\sqrt{2}\right)\, \text{Sin}\left[\frac{1}{4}\, (c+d\, x)\right]}{\left(-1+\sqrt{2}\right)\, \text{Cos}\left[\frac{1}{4}\, (c+d\, x)\right]-\text{Sin}\left[\frac{1}{4}\, (c+d\, x)\right]}\right]$$
$$\text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]^4\, \left(\sqrt{2}-2\, \text{Sin}\left[\frac{c}{2}\right]\right)-\frac{1}{-1+\sqrt{2}\, \text{Sin}\left[\frac{c}{2}\right]}32\, (5\, A-2\, B)\, \text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]^4$$
$$\text{Log}\left[2-\sqrt{2}\, \text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]-\sqrt{2}\, \text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right]\, \left(\sqrt{2}-2\, \text{Sin}\left[\frac{c}{2}\right]\right)-\frac{1}{-1+\sqrt{2}\, \text{Sin}\left[\frac{c}{2}\right]}$$
$$32\, (5\, A-2\, B)\, \text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]^4\, \text{Log}\left[2+\sqrt{2}\, \text{Cos}\left[\frac{1}{2}\, (c+d\, x)\right]-\sqrt{2}\, \text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right]$$
$$\left(\sqrt{2}-2\, \text{Sin}\left[\frac{c}{2}\right]\right)+2\, (67\, A-11\, B+10\, (11\, A-3\, B)\, \text{Cos}[c+d\, x]+(35\, A-11\, B)\, \text{Cos}[2\, (c+d\, x)])$$
$$\left.\text{Sec}[c+d\, x]\, \text{Sin}\left[\frac{1}{2}\, (c+d\, x)\right]\right)$$

Problem 122: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(A+B\, \text{Cos}[c+d\, x])\, \text{Sec}[c+d\, x]^3}{(a+a\, \text{Cos}[c+d\, x])^{5/2}}\, dx$$

Optimal (type 3, 264 leaves, 9 steps):

$$\frac{(39 A-20 B) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{4 a^{5/2} d}-\frac{(219 A-115 B) \operatorname{ArcTanh}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{16 \sqrt{2}\, a^{5/2} d}-$$

$$\frac{7 (9 A-5 B) \operatorname{Tan}[c+d x]}{16 a^2 d \sqrt{a+a \operatorname{Cos}[c+d x]}}-\frac{(A-B) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{4 d (a+a \operatorname{Cos}[c+d x])^{5/2}}-$$

$$\frac{(19 A-11 B) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{16 a d (a+a \operatorname{Cos}[c+d x])^{3/2}}+\frac{(31 A-15 B) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{16 a^2 d \sqrt{a+a \operatorname{Cos}[c+d x]}}$$

Result (type 3, 966 leaves):

$$\frac{(219 A-115 B) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right]}{4 d (a (1+\operatorname{Cos}[c+d x]))^{5/2}}+$$

$$\frac{(-219 A+115 B) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]\right]}{4 d (a (1+\operatorname{Cos}[c+d x]))^{5/2}}+$$

$$\frac{(39 A-20 B) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Log}\left[\sqrt{2}+2 \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]}{\sqrt{2}\, d (a (1+\operatorname{Cos}[c+d x]))^{5/2}}+$$

$$\left(i (39 A-20 B) \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2} \operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{-\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2} \operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right.$$

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

$$\left(i (39 A-20 B) \operatorname{ArcTan}\left[\frac{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]-\sqrt{2} \operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}{\operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]+\sqrt{2} \operatorname{Cos}\left[\frac{c}{4}+\frac{d x}{4}\right]-\operatorname{Sin}\left[\frac{c}{4}+\frac{d x}{4}\right]}\right] \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\right.$$

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

$$\left((39 A-20 B) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Log}\left[2-\sqrt{2} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2} \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\left(\sqrt{2}-2 \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right) \Big/$$

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

$$\left((39 A-20 B) \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Log}\left[2+\sqrt{2} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]-\sqrt{2} \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right]\left(\sqrt{2}-2 \operatorname{Sin}\left[\frac{c}{2}\right]\right)\right) \Big/$$

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

$$\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Sec}[c+d x]^2\left(-47 A \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+51 B \operatorname{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]-79 A \operatorname{Sin}\left[\frac{3 c}{2}+\frac{3 d x}{2}\right]+\right.\right.$$

$$59 B \operatorname{Sin}\left[\frac{3 c}{2}+\frac{3 d x}{2}\right]-127 A \operatorname{Sin}\left[\frac{5 c}{2}+\frac{5 d x}{2}\right]+75 B \operatorname{Sin}\left[\frac{5 c}{2}+\frac{5 d x}{2}\right]-$$

$$\left.\left.63 A \operatorname{Sin}\left[\frac{7 c}{2}+\frac{7 d x}{2}\right]+35 B \operatorname{Sin}\left[\frac{7 c}{2}+\frac{7 d x}{2}\right]\right)\right) \Big/ \left(64 d (a (1+\operatorname{Cos}[c+d x]))^{5/2}\right)$$

Problem 123: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d x]^{5/2} (a+a \text{Cos}[c+d x]) (A+B \text{Cos}[c+d x]) \, dx$$

Optimal (type 4, 159 leaves, 8 steps):

$$\frac{2 a (9 A+7 B) \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right]}{15 d}+\frac{10 a (A+B) \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right]}{21 d}+\frac{10 a (A+B) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{21 d}+\frac{2 a (9 A+7 B) \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{45 d}+\frac{2 a (A+B) \text{Cos}[c+d x]^{5/2} \text{Sin}[c+d x]}{7 d}+\frac{2 a B \text{Cos}[c+d x]^{7/2} \text{Sin}[c+d x]}{9 d}$$

Result (type 5, 914 leaves):

$$a \left(\sqrt{\text{Cos}[c+d x]} (1+\text{Cos}[c+d x]) \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\right.$$

$$\left(-\frac{(9 A+7 B) \text{Cot}[c]}{15 d}+\frac{23 (A+B) \text{Cos}[d x] \text{Sin}[c]}{84 d}+\frac{(18 A+19 B) \text{Cos}[2 d x] \text{Sin}[2 c]}{180 d}+\frac{(A+B) \text{Cos}[3 d x] \text{Sin}[3 c]}{28 d}+\frac{B \text{Cos}[4 d x] \text{Sin}[4 c]}{72 d}+\frac{23 (A+B) \text{Cos}[c] \text{Sin}[d x]}{84 d}+\frac{(18 A+19 B) \text{Cos}[2 c] \text{Sin}[2 d x]}{180 d}+\frac{(A+B) \text{Cos}[3 c] \text{Sin}[3 d x]}{28 d}+\frac{B \text{Cos}[4 c] \text{Sin}[4 d x]}{72 d}\right)-$$

$$\left(5 A (1+\text{Cos}[c+d x]) \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) \Big/ \left(21 d \sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(5 B (1+\text{Cos}[c+d x]) \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right) \Big/$$

$$\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{10\,d}3\,A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{30\,d}$$

$$7\,B\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

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

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 124: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 4, 132 leaves, 7 steps):

$$\frac{6\,a\,(A+B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{2\,a\,(7\,A+5\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{21\,d}+\frac{2\,a\,(7\,A+5\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,a\,(A+B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}+\frac{2\,a\,B\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 872 leaves):

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-\frac{3\,(A+B)\,\text{Cot}[c]}{5\,d}+\frac{\left(28\,A+23\,B\right)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{84\,d}+\frac{(A+B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\frac{B\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{28\,d}+\frac{\left(28\,A+23\,B\right)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{84\,d}+\frac{(A+B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}+\frac{B\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{28\,d}\right)-\right.$$

$$\left(A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(5\,B\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{10\,d}3\,A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big) \Big/ \left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right) - \frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}} + \frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg) - \frac{1}{10\,d}$$

$$3\,B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2 \Bigg(\Big(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big) \Big/ \left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right) - \frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}} + \frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)\Bigg)$$

Problem 125: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])\,(A+B\,\text{Cos}[c+d\,x])\,dx$$

Optimal (type 4, 101 leaves, 6 steps):

$$\frac{2\,a\,(5\,A+3\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d} + \frac{2\,a\,(A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d} + \frac{2\,a\,(A+B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d} + \frac{2\,a\,B\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 830 leaves) :

$$a\left(\sqrt{\text{Cos}[c+d\,x]}\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-\frac{(5\,A+3\,B)\,\text{Cot}[c]}{5\,d}+\frac{(A+B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{B\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{10\,d}+\frac{(A+B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{B\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{10\,d}\right)-\right.$$

$$\left(A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(B\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{2\,d}A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$
$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)-\frac{1}{10\,d}$$

$$3\,B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

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

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 126: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])\,(A+B\,\text{Cos}[c+d\,x])}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 70 leaves, 5 steps):

$$\frac{2\,a\,(A+B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+$$

$$\frac{2\,a\,(3\,A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+\frac{2\,a\,B\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 784 leaves):

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

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

$$A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\left(B\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{2\,d}A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}$$

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

$$\frac{1}{2\,d}B\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

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

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Bigg) -$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 127: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])\ (A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 66 leaves, 5 steps):

$$-\frac{2\,a\,(A-B)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{d}+\frac{2\,a\,(A+B)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 783 leaves):

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

$$\left(-\frac{(-2\,A+B+B\,\text{Cos}[2\,c])\ \text{Csc}[c]\ \text{Sec}[c]}{2\,d}+\frac{A\,\text{Sec}[c]\ \text{Sec}[c+d\,x]\ \text{Sin}[d\,x]}{d}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$A\ (1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$B\ (1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{2\,d}A\ (1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\right.$$
$$\left.\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}$$
$$\left.\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)-$$

$$\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$
$$\left.\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Big)\Big/$$
$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\Bigg)$$

Problem 128: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 95 leaves, 6 steps) :

$$-\frac{2\,a\,(A+B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{d}+\frac{2\,a\,(A+3\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 813 leaves):

$$a\,\Bigg(\sqrt{\text{Cos}[c+d\,x]}\,\,(1+\text{Cos}[c+d\,x])$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\frac{(A+B)\,\text{Csc}[c]\,\text{Sec}[c]}{d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(A\,\text{Sin}[c]+3\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x]\right)}{3\,d}\right)-$$

$$\Bigg(A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$

$$\left(3\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}B\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,+$$

$$\frac{1}{2\,d}A\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\,-\frac{1}{4}\right\},\,\left\{\frac{3}{4}\right\},\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]$$

$$\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\Bigg)\Bigg/\Bigg(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}$$

$$\left.\sqrt{1+\text{Tan}[c]^2}\right)-\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)+$$

$$\frac{1}{2\,d}B\,(1+\text{Cos}[c+d\,x])\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\right.\right.\right.$$

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

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\right)\Bigg)$$

Problem 129: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])\ (A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 132 leaves, 7 steps):

$$-\frac{2\,a\,(3\,A+5\,B)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{2\,a\,(A+B)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}+$$

$$\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,a\,(A+B)\ \text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,(3\,A+5\,B)\ \text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 865 leaves):

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

$$\left(\frac{(3 A+5 B) \operatorname{Csc}[c] \operatorname{Sec}[c]}{5 d}+\frac{A \operatorname{Sec}[c] \operatorname{Sec}[c+d x]^3 \operatorname{Sin}[d x]}{5 d}+\right.$$

$$\frac{\operatorname{Sec}[c] \operatorname{Sec}[c+d x]^2 (3 A \operatorname{Sin}[c]+5 A \operatorname{Sin}[d x]+5 B \operatorname{Sin}[d x])}{15 d}+\frac{1}{15 d}$$

$$\left.\operatorname{Sec}[c] \operatorname{Sec}[c+d x] (5 A \operatorname{Sin}[c]+5 B \operatorname{Sin}[c]+9 A \operatorname{Sin}[d x]+15 B \operatorname{Sin}[d x])\right)-$$

$$\left(A (1+\operatorname{Cos}[c+d x]) \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\},\left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]\right.$$

$$\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\left.\sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/ \left(3 d \sqrt{1+\operatorname{Cot}[c]^2}\right)-$$

$$\left(B (1+\operatorname{Cos}[c+d x]) \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\},\left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]\right.$$

$$\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/$$

$$\left(3 d \sqrt{1+\operatorname{Cot}[c]^2}\right)+\frac{1}{10 d} 3 A (1+\operatorname{Cos}[c+d x]) \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$

$$\left(\left(\operatorname{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\}, \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right]\right.\right.$$

$$\left.\operatorname{Sin}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right) \Big/$$

$$\left(\sqrt{1-\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{1+\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]}\right.$$

$$\left.\sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}} \sqrt{1+\operatorname{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+\frac{1}{2\,d}$$

$$B\,\left(1+\text{Cos}[c+d\,x]\right)\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\right.\right.\right.$$

$$\left.\left.\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/$$

$$\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\right)$$

Problem 130: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 4, 194 leaves, 8 steps):

$$\frac{4\,a^2\,\left(9\,A+8\,B\right)\,\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{15\,d}+\frac{4\,a^2\,\left(6\,A+5\,B\right)\,\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{21\,d}+$$
$$\frac{4\,a^2\,\left(6\,A+5\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{4\,a^2\,\left(9\,A+8\,B\right)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{45\,d}+$$
$$\frac{2\,a^2\,\left(9\,A+11\,B\right)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{63\,d}+\frac{2\,B\,\text{Cos}[c+d\,x]^{5/2}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 5, 944 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(-\frac{\left(9\,A+8\,B\right)\,\text{Cot}[c]}{15\,d}+\frac{\left(51\,A+46\,B\right)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{168\,d}+\frac{\left(36\,A+37\,B\right)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{360\,d}+\right.$$

$$\frac{(A+2B)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{56\,d}+\frac{B\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{144\,d}+\frac{(51\,A+46\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{168\,d}+$$

$$\left.\frac{(36\,A+37\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{360\,d}+\frac{(A+2B)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{56\,d}+\frac{B\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{144\,d}\right)-$$

$$\frac{1}{7\,d\,\sqrt{1+\text{Cot}[c]^2}}2\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\left(5\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(21\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{10\,d}3\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

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

$$\frac{1}{15\,d}4\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 131: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,(A+B\,\text{Cos}[c+d\,x])\,dx$$

Optimal (type 4, 161 leaves, 7 steps):

$$\frac{4\,a^2\,(4\,A+3\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^2\,(7\,A+6\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$
$$\frac{4\,a^2\,(7\,A+6\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{2\,a^2\,(7\,A+9\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{35\,d}+$$
$$\frac{2\,B\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 5, 898 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(-\frac{(4\,A+3\,B)\,\text{Cot}[c]}{5\,d}+\frac{(56\,A+51\,B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{168\,d}+\right.$$
$$\frac{(A+2\,B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{20\,d}+\frac{B\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{56\,d}+\frac{(56\,A+51\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{168\,d}+$$
$$\left.\frac{(A+2\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{20\,d}+\frac{B\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{56\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -\ \frac{1}{7\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ -$$

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

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)\ -$$

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

$$\frac{1}{10\,d}3\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)\ -$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 132: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 126 leaves, 6 steps):

$$\frac{4\,a^2\,(5\,A+4\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{5\,d}+\frac{4\,a^2\,(2\,A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{3\,d}+$$
$$\frac{2\,a^2\,(5\,A+7\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,B\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 852 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(-\frac{(5\,A+4\,B)\,\text{Cot}[c]}{5\,d}+\frac{(A+2\,B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{6\,d}+\frac{B\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{20\,d}+\right.$$
$$\left.\frac{(A+2\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{6\,d}+\frac{B\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{20\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$B\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$
$$\frac{1}{2\,d}A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

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

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

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 133: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^2\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 118 leaves, 6 steps):

$$\frac{4\,a^2\,B\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x)\,,\,2\right]}{d}+\frac{4\,a^2\,(3\,A+2\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x)\,,\,2\right]}{3\,d}-\frac{2\,a^2\,(3\,A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,A\,\left(a^2+a^2\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 623 leaves):

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

$$\left(-\frac{\left(-A+2\,B+A\,\text{Cos}[2\,c]+2\,B\,\text{Cos}[2\,c]\right)\,\text{Csc}[c]\,\text{Sec}[c]}{4\,d}+\frac{B\,\text{Cos}[d\,x]\,\text{Sin}[c]}{6\,d}+\right.$$

$$\left.\frac{B\,\text{Cos}[c]\,\text{Sin}[d\,x]}{6\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{2\,d}\right)-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}$$

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

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

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-$$

$$\frac{1}{2\,d}B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 134: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^2 (A + B \operatorname{Cos}[c + d x])}{\operatorname{Cos}[c + d x]^{5/2}} \, dx$$

Optimal (type 4, 120 leaves, 6 steps):

$$-\frac{4 a^2 A \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{d} + \frac{4 a^2 (2 A + 3 B) \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{3 d} + \frac{2 a^2 (5 A + 3 B) \operatorname{Sin}[c + d x]}{3 d \sqrt{\operatorname{Cos}[c + d x]}} + \frac{2 A \left(a^2 + a^2 \operatorname{Cos}[c + d x]\right) \operatorname{Sin}[c + d x]}{3 d \operatorname{Cos}[c + d x]^{3/2}}$$

Result (type 5, 624 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\;(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(-\frac{(-4\,A-B+B\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{4\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{6\,d}+\right.$$
$$\left.\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(A\,\text{Sin}[c]+6\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x])}{6\,d}\right)-\frac{1}{3\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$2\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$B\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$
$$\frac{1}{2\,d}A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$
$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\;\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\;\sqrt{1+\text{Tan}[c]^2}\right)-$$
$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 135: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^2 (A + B \operatorname{Cos}[c + d x])}{\operatorname{Cos}[c + d x]^{7/2}} \, dx$$

Optimal (type 4, 159 leaves, 7 steps):

$$-\frac{4 a^2 (4 A + 5 B) \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right]}{5 d} + \frac{4 a^2 (A + 2 B) \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right]}{3 d} + \frac{2 a^2 (7 A + 5 B) \operatorname{Sin}[c + d x]}{15 d \operatorname{Cos}[c + d x]^{3/2}} + \frac{4 a^2 (4 A + 5 B) \operatorname{Sin}[c + d x]}{5 d \sqrt{\operatorname{Cos}[c + d x]}} + \frac{2 A \left(a^2 + a^2 \operatorname{Cos}[c + d x]\right) \operatorname{Sin}[c + d x]}{5 d \operatorname{Cos}[c + d x]^{5/2}}$$

Result (type 5, 883 leaves):

$$\sqrt{\operatorname{Cos}[c + d x]} \, (a + a \operatorname{Cos}[c + d x])^2 \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(\frac{(4 A + 5 B) \operatorname{Csc}[c] \operatorname{Sec}[c]}{5 d} + \frac{A \operatorname{Sec}[c] \operatorname{Sec}[c + d x]^3 \operatorname{Sin}[d x]}{10 d} + \frac{\operatorname{Sec}[c] \operatorname{Sec}[c + d x]^2 (3 A \operatorname{Sin}[c] + 10 A \operatorname{Sin}[d x] + 5 B \operatorname{Sin}[d x])}{30 d} + \frac{1}{30 d} \operatorname{Sec}[c] \operatorname{Sec}[c + d x] (10 A \operatorname{Sin}[c] + 5 B \operatorname{Sin}[c] + 24 A \operatorname{Sin}[d x] + 30 B \operatorname{Sin}[d x])\right) -$$

$$\frac{1}{3 d \sqrt{1 + \operatorname{Cot}[c]^2}} A (a + a \operatorname{Cos}[c + d x])^2 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} - \frac{1}{3 d \sqrt{1 + \operatorname{Cot}[c]^2}}$$

$$2 B (a + a \operatorname{Cos}[c + d x])^2 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \operatorname{Sec}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1 - \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1 + \operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1 + \operatorname{Sin}[d x - \operatorname{ArcTan}[\operatorname{Cot}[c]]]} +$$

$$\frac{1}{5 d} 2 A (a + a \operatorname{Cos}[c + d x])^2 \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2} + \frac{d x}{2}\right]^4 \left(\left(\operatorname{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{4}\right\}, \left\{\frac{3}{4}\right\}, \operatorname{Cos}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d x + \operatorname{ArcTan}[\operatorname{Tan}[c]]]\right.\right.$$

$$\text{Tan}[c]\Big) \Big/ \Big(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Big) -$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg) +$$

$$\frac{1}{2\,d}B\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Csc}[c]\ \text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^4$$

$$\Bigg(\Big(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]$$

$$\text{Tan}[c]\Big) \Big/ \Big(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Big) -$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)$$

Problem 136: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])^2\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 194 leaves, 8 steps):

$$-\frac{4\,a^2\,(3\,A+4\,B)\ \text{EllipticE}\big[\frac{1}{2}\,(c+d\,x),2\big]}{5\,d}+\frac{4\,a^2\,(6\,A+7\,B)\ \text{EllipticF}\big[\frac{1}{2}\,(c+d\,x),2\big]}{21\,d}+$$

$$\frac{2\,a^2\,(9\,A+7\,B)\ \text{Sin}[c+d\,x]}{35\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{4\,a^2\,(6\,A+7\,B)\ \text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+$$

$$\frac{4\,a^2\,(3\,A+4\,B)\ \text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,A\,(a^2+a^2\,\text{Cos}[c+d\,x])\ \text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 925 leaves):

$$\sqrt{\text{Cos}[c+d x]}\ (a+a\,\text{Cos}[c+d x])^2\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(\frac{(3 A+4 B)\,\text{Csc}[c]\,\text{Sec}[c]}{5 d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d x]^4\,\text{Sin}[d x]}{14 d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(5 A\,\text{Sin}[c]+14 A\,\text{Sin}[d x]+7 B\,\text{Sin}[d x])}{70 d}+\frac{1}{210 d}\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(42 A\,\text{Sin}[c]+21 B\,\text{Sin}[c]+60 A\,\text{Sin}[d x]+70 B\,\text{Sin}[d x])+\frac{1}{105 d}\text{Sec}[c]\,\text{Sec}[c+d x]\,(30 A\,\text{Sin}[c]+35 B\,\text{Sin}[c]+63 A\,\text{Sin}[d x]+84 B\,\text{Sin}[d x])\right)-$$

$$\frac{1}{7 d\sqrt{1+\text{Cot}[c]^2}}2 A\,(a+a\,\text{Cos}[c+d x])^2\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{3 d\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,(a+a\,\text{Cos}[c+d x])^2\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{10 d}3 A\,(a+a\,\text{Cos}[c+d x])^2\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\sqrt{1+\text{Tan}[c]^2}}\sqrt{1+\text{Tan}[c]^2}\right)-\right.$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+$$

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

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 137: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 4, 237 leaves, 9 steps):

$$\frac{4\,a^3\,\left(17\,A+15\,B\right)\,\text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{15\,d}+$$
$$\frac{4\,a^3\,\left(121\,A+105\,B\right)\,\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{231\,d}+\frac{4\,a^3\,\left(121\,A+105\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{231\,d}+$$
$$\frac{4\,a^3\,\left(17\,A+15\,B\right)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{45\,d}+\frac{20\,a^3\,\left(22\,A+21\,B\right)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{693\,d}+$$
$$\frac{2\,a\,B\,\text{Cos}[c+d\,x]^{5/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\text{Sin}[c+d\,x]}{11\,d}+$$
$$\frac{2\,\left(11\,A+15\,B\right)\,\text{Cos}[c+d\,x]^{5/2}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{99\,d}$$

Result (type 5, 990 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(-\frac{(17\,A+15\,B)\,\text{Cot}[c]}{30\,d}+\frac{(2134\,A+1953\,B)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{7392\,d}+\frac{(73\,A+75\,B)\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{720\,d}+\right.$$

$$\frac{3\,(44\,A+63\,B)\,\text{Cos}[3\,d\,x]\,\text{Sin}[3\,c]}{4928\,d}+\frac{(A+3\,B)\,\text{Cos}[4\,d\,x]\,\text{Sin}[4\,c]}{288\,d}+\frac{B\,\text{Cos}[5\,d\,x]\,\text{Sin}[5\,c]}{704\,d}+$$

$$\frac{(2134\,A+1953\,B)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{7392\,d}+\frac{(73\,A+75\,B)\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{720\,d}+$$

$$\left.\frac{3\,(44\,A+63\,B)\,\text{Cos}[3\,c]\,\text{Sin}[3\,d\,x]}{4928\,d}+\frac{(A+3\,B)\,\text{Cos}[4\,c]\,\text{Sin}[4\,d\,x]}{288\,d}+\frac{B\,\text{Cos}[5\,c]\,\text{Sin}[5\,d\,x]}{704\,d}\right)-$$

$$\left(11\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(42\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(5\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

$$\left(22\,d\,\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{60\,d}17\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

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

$$\frac{1}{4\,d}B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 138: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 4, 204 leaves, 8 steps):

$$\frac{4\,a^3\,(21\,A+17\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{4\,a^3\,(13\,A+11\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$

$$\frac{4\,a^3\,(13\,A+11\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{21\,d}+\frac{4\,a^3\,(24\,A+23\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d}+$$

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

$$\frac{2\,(9\,A+13\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{63\,d}$$

Result (type 5, 944 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(-\frac{(21 A+17 B) \operatorname{Cot}[c]}{30 d}+\frac{(107 A+97 B) \operatorname{Cos}[d x] \operatorname{Sin}[c]}{336 d}+\frac{(54 A+73 B) \operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]}{720 d}+\frac{(A+3 B) \operatorname{Cos}[3 d x] \operatorname{Sin}[3 c]}{112 d}+\frac{B \operatorname{Cos}[4 d x] \operatorname{Sin}[4 c]}{288 d}+\frac{(107 A+97 B) \operatorname{Cos}[c] \operatorname{Sin}[d x]}{336 d}+\frac{(54 A+73 B) \operatorname{Cos}[2 c] \operatorname{Sin}[2 d x]}{720 d}+\frac{(A+3 B) \operatorname{Cos}[3 c] \operatorname{Sin}[3 d x]}{112 d}+\frac{B \operatorname{Cos}[4 c] \operatorname{Sin}[4 d x]}{288 d}\right)-$$

$$\left(13 A\,(a+a \operatorname{Cos}[c+d x])^3 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right)\Big/\left(42 d \sqrt{1+\operatorname{Cot}[c]^2}\right)-$$

$$\left(11 B\,(a+a \operatorname{Cos}[c+d x])^3 \operatorname{Csc}[c] \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right)\Big/$$

$$\left(42 d \sqrt{1+\operatorname{Cot}[c]^2}\right)-\frac{1}{20 d} 7 A\,(a+a \operatorname{Cos}[c+d x])^3 \operatorname{Csc}[c] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$

$$\left(\left(\operatorname{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]^2\right] \operatorname{Sin}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]\right)\Big/\left(\sqrt{1-\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{1+\operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]]} \sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}} \sqrt{1+\operatorname{Tan}[c]^2}\right)-\right.$$

$$\left.\frac{\frac{\operatorname{Sin}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \operatorname{Tan}[c]}{\sqrt{1+\operatorname{Tan}[c]^2}}+\frac{2 \operatorname{Cos}[c]^2 \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}}{\operatorname{Cos}[c]^2+\operatorname{Sin}[c]^2}}{\sqrt{\operatorname{Cos}[c] \operatorname{Cos}[d x+\operatorname{ArcTan}[\operatorname{Tan}[c]]] \sqrt{1+\operatorname{Tan}[c]^2}}}\right)-$$

$$\frac{1}{60\,d} 17\,B\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6 \left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\,\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\,\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}\,\sqrt{1+\mathrm{Tan}[c]^2}\right) - \frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\sqrt{1+\mathrm{Tan}[c]^2}}}\right)$$

Problem 139: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\mathrm{Cos}[c+d\,x])^3\,(A+B\,\mathrm{Cos}[c+d\,x])}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 171 leaves, 7 steps):

$$\frac{4\,a^3\,(9\,A+7\,B)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\,(21\,A+13\,B)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+\frac{4\,a^3\,(42\,A+41\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{105\,d}+\frac{2\,a\,B\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^2\,\mathrm{Sin}[c+d\,x]}{7\,d}+\frac{2\,(7\,A+11\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(a^3+a^3\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sin}[c+d\,x]}{35\,d}$$

Result (type 5, 898 leaves):

$$\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+a\,\mathrm{Cos}[c+d\,x])^3\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(-\frac{(9\,A+7\,B)\,\mathrm{Cot}[c]}{10\,d}+\frac{(84\,A+107\,B)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{336\,d}+\frac{(A+3\,B)\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{40\,d}+\frac{B\,\mathrm{Cos}[3\,d\,x]\,\mathrm{Sin}[3\,c]}{112\,d}+\frac{(84\,A+107\,B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{336\,d}+\right.$$

$$\frac{(A+3B)\,\text{Cos}[2c]\,\text{Sin}[2dx]}{40d}+\frac{B\,\text{Cos}[3c]\,\text{Sin}[3dx]}{112d}\Bigg)-\frac{1}{2d\sqrt{1+\text{Cot}[c]^2}}$$

$$A\,(a+a\,\text{Cos}[c+dx])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^6\,\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,-$$

$$\Bigg(13B\,(a+a\,\text{Cos}[c+dx])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^6\,\text{Sec}[dx-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(42d\sqrt{1+\text{Cot}[c]^2}\Big)-\frac{1}{20d}9A\,(a+a\,\text{Cos}[c+dx])^3\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^6$$

$$\Bigg(\Big(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[dx+\text{ArcTan}[\text{Tan}[c]]]$$

$$\text{Tan}[c]\Big)\Big/\Big(\sqrt{1-\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{\text{Cos}[c]\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\Big)-$$

$$\frac{\frac{\text{Sin}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\Bigg)-$$

$$\frac{1}{20d}7B\,(a+a\,\text{Cos}[c+dx])^3\,\text{Csc}[c]\,\text{Sec}\Big[\frac{c}{2}+\frac{dx}{2}\Big]^6$$

$$\Bigg(\Big(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[dx+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\,\text{Sin}[dx+\text{ArcTan}[\text{Tan}[c]]]$$

$$\text{Tan}[c]\Big) \Big/ \left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right) -$$

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

Problem 140: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])^3\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 169 leaves, 7 steps):

$$\frac{4\,a^3\,(5\,A+9\,B)\ \text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,d}+\frac{4\,a^3\,(5\,A+3\,B)\ \text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}-$$
$$\frac{4\,a^3\,(5\,A-6\,B)\ \sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{15\,d}+\frac{2\,a\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}-$$
$$\frac{2\,(5\,A-B)\ \sqrt{\text{Cos}[c+d\,x]}\ \left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\ \text{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 888 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\ (a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\left(-\frac{(5\,A+18\,B+15\,A\,\text{Cos}[2\,c]+18\,B\,\text{Cos}[2\,c])\ \text{Csc}[c]\ \text{Sec}[c]}{40\,d}+\right.$$
$$\frac{(A+3\,B)\ \text{Cos}[d\,x]\ \text{Sin}[c]}{12\,d}+\frac{B\,\text{Cos}[2\,d\,x]\ \text{Sin}[2\,c]}{40\,d}+\frac{(A+3\,B)\ \text{Cos}[c]\ \text{Sin}[d\,x]}{12\,d}+$$
$$\left.\frac{A\,\text{Sec}[c]\ \text{Sec}[c+d\,x]\ \text{Sin}[d\,x]}{4\,d}+\frac{B\,\text{Cos}[2\,c]\ \text{Sin}[2\,d\,x]}{40\,d}\right)-\frac{1}{6\,d\,\sqrt{1+\text{Cot}[c]^2}}$$
$$5\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-\;\frac{1}{2\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\;-$$

$$\frac{1}{4\,d}A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\,-\frac{1}{4}\right\},\,\left\{\frac{3}{4}\right\},\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)\;-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)\;-$$

$$\frac{1}{20\,d}9\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\,-\frac{1}{4}\right\},\,\left\{\frac{3}{4}\right\},\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)\;-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 141: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^3\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 161 leaves, 7 steps):

$$-\frac{4\,a^3\,(A-B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{d}+\frac{20\,a^3\,(A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,d}-\frac{4\,a^3\,(4\,A+B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,a\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,(7\,A+3\,B)\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 5, 879 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(-\frac{(-5\,A+B+A\,\text{Cos}[2\,c]+3\,B\,\text{Cos}[2\,c])\,\text{Csc}[c]\,\text{Sec}[c]}{8\,d}+\frac{B\,\text{Cos}[d\,x]\,\text{Sin}[c]}{12\,d}+\frac{B\,\text{Cos}[c]\,\text{Sin}[d\,x]}{12\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{12\,d}+\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]\,(A\,\text{Sin}[c]+9\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x])}{12\,d}\right)-$$

$$\frac{1}{6\,d\,\sqrt{1+\text{Cot}[c]^2}}5\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{6\,d\,\sqrt{1+\text{Cot}[c]^2}}$$

$$5\,B\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{4d}A\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\right.\right.$$

$$\left.\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\right.$$

$$\left.\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}}\right)-$$

$$\frac{1}{4d}B\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\mathrm{Csc}[c]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\mathrm{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]^2\right]\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\right.\right.$$

$$\left.\mathrm{Tan}[c]\right)\Big/\left(\sqrt{1-\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\sqrt{1+\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]}\right.$$

$$\left.\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}\sqrt{1+\mathrm{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\mathrm{Sin}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\,\mathrm{Tan}[c]}{\sqrt{1+\mathrm{Tan}[c]^2}}+\frac{2\,\mathrm{Cos}[c]^2\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}{\mathrm{Cos}[c]^2+\mathrm{Sin}[c]^2}}{\sqrt{\mathrm{Cos}[c]\,\mathrm{Cos}[d\,x+\mathrm{ArcTan}[\mathrm{Tan}[c]]]\sqrt{1+\mathrm{Tan}[c]^2}}}\right)$$

Problem 142: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^3\left(A+B\,\mathrm{Cos}[c+d\,x]\right)}{\mathrm{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 171 leaves, 7 steps):

$$-\frac{4 a^3 (9 A+5 B) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{5 d}+\frac{4 a^3 (3 A+5 B) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{3 d}+\frac{4 a^3 (21 A+20 B) \text{Sin}[c+d x]}{15 d \sqrt{\text{Cos}[c+d x]}}+\frac{2 a A (a+a \text{Cos}[c+d x])^2 \text{Sin}[c+d x]}{5 d \text{Cos}[c+d x]^{5/2}}+\frac{2 (9 A+5 B) \left(a^3+a^3 \text{Cos}[c+d x]\right) \text{Sin}[c+d x]}{15 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 5, 890 leaves):

$$\sqrt{\text{Cos}[c+d x]} (a+a \text{Cos}[c+d x])^3 \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-\frac{(-36 A-25 B+5 B \text{Cos}[2 c]) \text{Csc}[c] \text{Sec}[c]}{40 d}+\frac{A \text{Sec}[c] \text{Sec}[c+d x]^3 \text{Sin}[d x]}{20 d}+\frac{\text{Sec}[c] \text{Sec}[c+d x]^2 (3 A \text{Sin}[c]+15 A \text{Sin}[d x]+5 B \text{Sin}[d x])}{60 d}+\frac{1}{60 d} \text{Sec}[c] \text{Sec}[c+d x] (15 A \text{Sin}[c]+5 B \text{Sin}[c]+54 A \text{Sin}[d x]+45 B \text{Sin}[d x])\right)-$$

$$\frac{1}{2 d \sqrt{1+\text{Cot}[c]^2}} A (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}-\frac{1}{6 d \sqrt{1+\text{Cot}[c]^2}}$$

$$5 B (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]] \sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]} \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$

$$\frac{1}{20 d} 9 A (a+a \text{Cos}[c+d x])^3 \text{Csc}[c] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right] \text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]] \text{Tan}[c]\right) \Big/ \left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]} \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\right.\right.$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)+$$

$$\frac{1}{4\,d}B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\ \text{Csc}[c]\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\,-\frac{1}{4}\right\},\,\left\{\frac{3}{4}\right\},\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]$$

$$\text{Tan}[c]\Bigg)\Bigg/\Bigg(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)$$

Problem 143: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^3\ \left(A+B\,\text{Cos}[c+d\,x]\right)}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 204 leaves, 8 steps):

$$-\frac{4\,a^3\,\left(7\,A+9\,B\right)\ \text{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),\,2\right]}{5\,d}+\frac{4\,a^3\,\left(13\,A+21\,B\right)\ \text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,2\right]}{21\,d}+$$

$$\frac{4\,a^3\,\left(41\,A+42\,B\right)\ \text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^3\,\left(7\,A+9\,B\right)\ \text{Sin}[c+d\,x]}{5\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$

$$\frac{2\,a\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\ \text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,\left(11\,A+7\,B\right)\ \left(a^3+a^3\,\text{Cos}[c+d\,x]\right)\ \text{Sin}[c+d\,x]}{35\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 5, 925 leaves):

$$\sqrt{\text{Cos}[c+d x]}\ (a+a\,\text{Cos}[c+d x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$
$$\left(\frac{(7 A+9 B)\,\text{Csc}[c]\,\text{Sec}[c]}{10 d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d x]^4\,\text{Sin}[d x]}{28 d}+\right.$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d x]^3\,(5 A\,\text{Sin}[c]+21 A\,\text{Sin}[d x]+7 B\,\text{Sin}[d x])}{140 d}+\frac{1}{420 d}$$
$$\text{Sec}[c]\,\text{Sec}[c+d x]^2\,(63 A\,\text{Sin}[c]+21 B\,\text{Sin}[c]+130 A\,\text{Sin}[d x]+105 B\,\text{Sin}[d x])+\frac{1}{420 d}$$
$$\left.\text{Sec}[c]\,\text{Sec}[c+d x]\,(130 A\,\text{Sin}[c]+105 B\,\text{Sin}[c]+294 A\,\text{Sin}[d x]+378 B\,\text{Sin}[d x])\right)-$$
$$\left(13 A\,(a+a\,\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(42 d\sqrt{1+\text{Cot}[c]^2}\right)-\frac{1}{2 d\sqrt{1+\text{Cot}[c]^2}}B\,(a+a\,\text{Cos}[c+d x])^3\,\text{Csc}[c]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6\,\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}+$$
$$\frac{1}{20 d}7 A\,(a+a\,\text{Cos}[c+d x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$
$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\text{Sin}[d x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$
$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$
$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)+$$

$$\frac{1}{20\,d}9\,B\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\left.\text{Tan}[c]\right)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 144: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^3\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 237 leaves, 9 steps):

$$-\frac{4\,a^3\,(17\,A+21\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{15\,d}+\frac{4\,a^3\,(11\,A+13\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{21\,d}+$$

$$\frac{4\,a^3\,(23\,A+24\,B)\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{4\,a^3\,(11\,A+13\,B)\,\text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{4\,a^3\,(17\,A+21\,B)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$

$$\frac{2\,a\,A\,(a+a\,\text{Cos}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}+\frac{2\,(13\,A+9\,B)\,(a^3+a^3\,\text{Cos}[c+d\,x])\,\text{Sin}[c+d\,x]}{63\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 5, 967 leaves):

$$\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\frac{(17\,A+21\,B)\,\text{Csc}[c]\,\text{Sec}[c]}{30\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^5\,\text{Sin}[d\,x]}{36\,d}+\right.$$

$$\frac{\text{Sec}[c]\ \text{Sec}[c+d\,x]^4\ (7\,A\,\text{Sin}[c]+27\,A\,\text{Sin}[d\,x]+9\,B\,\text{Sin}[d\,x])}{252\,d}+\frac{1}{210\,d}$$

$$\text{Sec}[c]\ \text{Sec}[c+d\,x]\ (55\,A\,\text{Sin}[c]+65\,B\,\text{Sin}[c]+119\,A\,\text{Sin}[d\,x]+147\,B\,\text{Sin}[d\,x])+\frac{1}{1260\,d}$$

$$\text{Sec}[c]\ \text{Sec}[c+d\,x]^3\ (135\,A\,\text{Sin}[c]+45\,B\,\text{Sin}[c]+238\,A\,\text{Sin}[d\,x]+189\,B\,\text{Sin}[d\,x])+\frac{1}{1260\,d}$$

$$\text{Sec}[c]\ \text{Sec}[c+d\,x]^2\ (238\,A\,\text{Sin}[c]+189\,B\,\text{Sin}[c]+330\,A\,\text{Sin}[d\,x]+390\,B\,\text{Sin}[d\,x])\Bigg)-$$

$$\Bigg(11\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\ \text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/\Big(42\,d\,\sqrt{1+\text{Cot}[c]^2}\Big)-$$

$$\Bigg(13\,B\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\ \text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\ \text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\ \sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\ \sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\Big(42\,d\,\sqrt{1+\text{Cot}[c]^2}\Big)+\frac{1}{60\,d}17\,A\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]\ \text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6$$

$$\Bigg(\Bigg(\text{HypergeometricPFQ}\Big[\Big\{-\frac{1}{2},-\frac{1}{4}\Big\},\Big\{\frac{3}{4}\Big\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\Big]\ \text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]$$

$$\text{Tan}[c]\Bigg)\Big/\Bigg(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\ \sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}$$

$$\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}\ \sqrt{1+\text{Tan}[c]^2}\Bigg)-$$

$$\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\ \text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\ \sqrt{1+\text{Tan}[c]^2}}}\Bigg)+$$

$$\frac{1}{20\,d}7\,B\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Csc}[c]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$

$$\left(\left(\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{4}\right\},\left\{\frac{3}{4}\right\},\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]^2\right]\,\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\right.\right.$$

$$\text{Tan}[c]\Big)\Big/\left(\sqrt{1-\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\,\sqrt{1+\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]}\right.$$

$$\left.\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}\,\sqrt{1+\text{Tan}[c]^2}\right)-$$

$$\left.\frac{\frac{\text{Sin}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\text{Tan}[c]}{\sqrt{1+\text{Tan}[c]^2}}+\frac{2\,\text{Cos}[c]^2\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}{\text{Cos}[c]^2+\text{Sin}[c]^2}}{\sqrt{\text{Cos}[c]\,\text{Cos}[d\,x+\text{ArcTan}[\text{Tan}[c]]]\,\sqrt{1+\text{Tan}[c]^2}}}\right)$$

Problem 145: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{a+a\,\text{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 156 leaves, 6 steps):

$$-\frac{3\,(5\,A-7\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a\,d}+\frac{5\,(A-B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}+\frac{5\,(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a\,d}-\frac{(5\,A-7\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}+\frac{(A-B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{d\,\left(a+a\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1182 leaves):

$$-\left(\left(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.\right.$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$

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

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

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

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\operatorname{Cos}[2 c]+i e^{2 i d x}\operatorname{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-i d\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(4\left(a+a\operatorname{Cos}[c+d x]\right)\right)\Bigg)+\Bigg(21 i B\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$
$$\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x}\operatorname{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\operatorname{Cos}[c]+i\operatorname{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\operatorname{Cos}[2 c]+i e^{2 i d x}\operatorname{Sin}[2 c]}\Bigg)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)-$$
$$\Bigg(2\operatorname{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\operatorname{Cos}[c]+i\operatorname{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\operatorname{Cos}[2 c]+i e^{2 i d x}\operatorname{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-i d\left(1+e^{2 i d x}\right)\operatorname{Cos}[c]+d\left(-1+e^{2 i d x}\right)\operatorname{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(20\left(a+a\operatorname{Cos}[c+d x]\right)\right)+\frac{1}{a+a\operatorname{Cos}[c+d x]}$$
$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$
$$\sqrt{\operatorname{Cos}[c+d x]}$$
$$\Bigg(\frac{2\left(5 A-5 B+10 A\operatorname{Cos}[c]-16 B\operatorname{Cos}[c]\right)\operatorname{Csc}[c]}{5 d}+$$
$$\frac{4(A-B)\operatorname{Cos}[d x]\operatorname{Sin}[c]}{3 d}+$$
$$\frac{2 B\operatorname{Cos}[2 d x]\operatorname{Sin}[2 c]}{5 d}+$$
$$\frac{2\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(A\operatorname{Sin}\left[\frac{d x}{2}\right]-B\operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{d}+$$
$$\frac{4(A-B)\operatorname{Cos}[c]\operatorname{Sin}[d x]}{3 d}+$$
$$\frac{2 B\operatorname{Cos}[2 c]\operatorname{Sin}[2 d x]}{5 d}\Bigg)-$$

$$\left(5\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$

$$\left(5\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]\,\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\,\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/\left(3\,d\,(a+a\,\mathrm{Cos}[c+d\,x])\,\sqrt{1+\mathrm{Cot}[c]^2}\right)$$

Problem 146: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^{3/2}\,(A+B\,\mathrm{Cos}[c+d\,x])}{a+a\,\mathrm{Cos}[c+d\,x]}\,dx$$

Optimal (type 4, 123 leaves, 5 steps):

$$\frac{3\,(A-B)\,\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(3\,A-5\,B)\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}-\frac{(3\,A-5\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,a\,d}+\frac{(A-B)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{d\,(a+a\,\mathrm{Cos}[c+d\,x])}$$

Result (type 5, 1129 leaves):

$$\left(3\,i\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}\right]\right.$$

$$\Big(\Big(\Big(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i d x}\,\big(2\,(1+e^{2 i d x})\,\text{Cos}[c]+2\,i\,(-1+e^{2 i d x})\,\text{Sin}[c]\big)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Big)\Big/$$

$$\big(3\,i\,d\,(1+e^{2 i d x})\,\text{Cos}[c]-3\,d\,(-1+e^{2 i d x})\,\text{Sin}[c]\big)-$$

$$\Big(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i d x}\,\big(2\,(1+e^{2 i d x})\,\text{Cos}[c]+2\,i\,(-1+e^{2 i d x})\,\text{Sin}[c]\big)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Big)\Big/$$

$$\big(-i\,d\,(1+e^{2 i d x})\,\text{Cos}[c]+d\,(-1+e^{2 i d x})\,\text{Sin}[c]\big)\Big)\Big)\Big/$$

$$\big(4\,(a+a\,\text{Cos}[c+d x])\big)-\Big(3\,i\,B\,\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^2\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]$$

$$\Big(\Big(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i d x}\,\big(2\,(1+e^{2 i d x})\,\text{Cos}[c]+2\,i\,(-1+e^{2 i d x})\,\text{Sin}[c]\big)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Big)\Big/$$

$$\big(3\,i\,d\,(1+e^{2 i d x})\,\text{Cos}[c]-3\,d\,(-1+e^{2 i d x})\,\text{Sin}[c]\big)-$$

$$\Big(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i d x}\,\big(2\,(1+e^{2 i d x})\,\text{Cos}[c]+2\,i\,(-1+e^{2 i d x})\,\text{Sin}[c]\big)}\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Big)\Big/$$

$$\big(-i\,d\,(1+e^{2 i d x})\,\text{Cos}[c]+d\,(-1+e^{2 i d x})\,\text{Sin}[c]\big)\Big)\Big)\Big/$$

$$\big(4\,(a+a\,\text{Cos}[c+d x])\big)+\frac{1}{a+a\,\text{Cos}[c+d x]}$$

$$\text{Cos}\Big[\frac{c}{2}+\frac{d x}{2}\Big]^2\sqrt{\text{Cos}[c+d x]}$$

$$\Big(-\frac{2\,(A-B)\,(1+2\,\text{Cos}[c])\,\text{Csc}[c]}{d}+\frac{4\,B\,\text{Cos}[d x]\,\text{Sin}[c]}{3\,d}-\frac{2\,\text{Sec}\big[\frac{c}{2}\big]\,\text{Sec}\big[\frac{c}{2}+\frac{d x}{2}\big]\,\big(A\,\text{Sin}\big[\frac{d x}{2}\big]-B\,\text{Sin}\big[\frac{d x}{2}\big]\big)}{d}+\frac{4\,B\,\text{Cos}[c]\,\text{Sin}[d x]}{3\,d}\Big)+$$

$$\left(A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/ \left(d\,(a+a \operatorname{Cos}[c+d x]) \sqrt{1+\operatorname{Cot}[c]^2}\right) - \left(5 B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]] \sqrt{1-\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{-\sqrt{1+\operatorname{Cot}[c]^2} \operatorname{Sin}[c] \operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]} \sqrt{1+\operatorname{Sin}[d x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}\right) \Big/ \left(3 d\,(a+a \operatorname{Cos}[c+d x]) \sqrt{1+\operatorname{Cot}[c]^2}\right)$$

Problem 147: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\operatorname{Cos}[c+d x]}\,(A+B \operatorname{Cos}[c+d x])}{a+a \operatorname{Cos}[c+d x]}\,dx$$

Optimal (type 4, 85 leaves, 4 steps):

$$-\frac{(A-3 B) \operatorname{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a d}+\frac{(A-B) \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{a d}+\frac{(A-B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{d\,(a+a \operatorname{Cos}[c+d x])}$$

Result (type 5, 1098 leaves):

$$-\Bigg(\Bigg(\Bigg(i A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right] \Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\operatorname{Cos}[c]+i \operatorname{Sin}[c])^2\right] \Big/ \sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \operatorname{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \operatorname{Sin}[c]\right)}$$

$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/$$
$$\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Big/$$
$$(4 (a+a \text{Cos}[c+d x]))\Bigg)+\Bigg(3 i B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$
$$\text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/$$
$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/$$
$$\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Big/$$
$$(4 (a+a \text{Cos}[c+d x]))+\frac{1}{a+a \text{Cos}[c+d x]}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2$$
$$\sqrt{\text{Cos}[c+d x]}$$
$$\left(-\frac{2 (-A+B+2 B \text{Cos}[c]) \text{Csc}[c]}{d}+\right.$$
$$\left.\frac{2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \text{Sin}\left[\frac{d x}{2}\right]-B \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}\right)-$$
$$\Bigg(A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$
$$\left.\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\Bigg(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 148: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])}\,dx$$

Optimal (type 4, 83 leaves, 4 steps):

$$\frac{(A-B)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}+\frac{(A+B)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{a\,d}-\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1094 leaves):

$$\Bigg(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\,\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\Big]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$

$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)\Bigg)\Bigg/$$

$$\left(4\,\left(a+a\,\text{Cos}[c+d\,x]\right)\right)-\Bigg(i\,B\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\Big]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\Big]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$

$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)\Bigg)\Bigg/$$

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

$$\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2$$

$$\sqrt{\text{Cos}[c+d\,x]}$$

$$\Bigg(-\frac{2\,(A-B)\,\text{Csc}[c]}{d}-$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}\Bigg)-$$

$$\Bigg(A\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^2\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\,\frac{1}{2}\Big\},\,\Big\{\frac{5}{4}\Big\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]$$

$$\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

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

$$\Bigg(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg) \Big/$$

$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 149: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])}\,dx$$

Optimal (type 4, 119 leaves, 5 steps):

$$-\frac{(3\,A-B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}-\frac{(A-B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{(3\,A-B)\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1130 leaves):

$$-\Bigg(\Bigg(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg) \Big/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg) \Big/$$

$$\left(-\mathrm{i}\, d\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\operatorname{Cos}[c]+d\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\operatorname{Sin}[c]\right)\Big)\Big)\Big/$$

$$\left(4\left(a+a\operatorname{Cos}[c+d\,x]\right)\right)\Big)+\Big(\mathrm{i}\,B\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]$$

$$\Big(\Big(2\,e^{2\,\mathrm{i}\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,\mathrm{i}\,d\,x}\left(\operatorname{Cos}[c]+\mathrm{i}\operatorname{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,\mathrm{i}\,d\,x}\operatorname{Cos}[2\,c]+\mathrm{i}\,e^{2\,\mathrm{i}\,d\,x}\operatorname{Sin}[2\,c]}\Big)\Big/$$

$$\left(3\,\mathrm{i}\,d\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\operatorname{Cos}[c]-3\,d\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\operatorname{Sin}[c]\right)-$$

$$\Big(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,\mathrm{i}\,d\,x}\left(\operatorname{Cos}[c]+\mathrm{i}\operatorname{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,\mathrm{i}\,d\,x}\operatorname{Cos}[2\,c]+\mathrm{i}\,e^{2\,\mathrm{i}\,d\,x}\operatorname{Sin}[2\,c]}\Big)\Big/$$

$$\left(-\mathrm{i}\,d\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\operatorname{Cos}[c]+d\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\operatorname{Sin}[c]\right)\Big)\Big)\Big/$$

$$\left(4\left(a+a\operatorname{Cos}[c+d\,x]\right)\right)+\frac{1}{a+a\operatorname{Cos}[c+d\,x]}$$

$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2$$

$$\sqrt{\operatorname{Cos}[c+d\,x]}$$

$$\Bigg(\frac{\left(2\,A+A\operatorname{Cos}[c]-B\operatorname{Cos}[c]\right)\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[c]}{d}+$$

$$\frac{2\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\operatorname{Sin}\left[\frac{d\,x}{2}\right]-B\operatorname{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+$$

$$\frac{4\,A\operatorname{Sec}[c]\operatorname{Sec}[c+d\,x]\operatorname{Sin}[d\,x]}{d}\Bigg)+$$

$$\Bigg(A\operatorname{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\operatorname{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$

$$\left.\operatorname{Sin}[d\,x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]^2\right]$$

$$\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}[d\,x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]$$

$$\sqrt{1-\operatorname{Sin}[d\,x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\operatorname{Cot}[c]^2}\operatorname{Sin}[c]\operatorname{Sin}[d\,x-\operatorname{ArcTan}[\operatorname{Cot}[c]]]}$$

$$\left.\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\middle/\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)\right.-$$

$$\left(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\middle/\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)\right.$$

Problem 150: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])}\,dx$$

Optimal (type 4, 153 leaves, 6 steps):

$$\frac{3\,(A-B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a\,d}+\frac{(5\,A-3\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a\,d}+\frac{(5\,A-3\,B)\,\text{Sin}[c+d\,x]}{3\,a\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{3\,(A-B)\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B)\,\text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1167 leaves):

$$\left(3\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$

$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/$$

$$\left.\left.\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)\right) \Big/$$

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

$$\left(\left(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} \left(\text{Cos}[c]+i \text{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/$$

$$\left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$

$$\left(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} \left(\text{Cos}[c]+i \text{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\right) \Big/$$

$$\left.\left.\left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\right)\right) \Big/$$

$$\left(4 \left(a+a \text{Cos}[c+d x]\right)\right)+\frac{1}{a+a \text{Cos}[c+d x]}$$

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

$$\sqrt{\text{Cos}[c+d x]}$$

$$\left(-\frac{(A-B) \left(2+\text{Cos}[c]\right) \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \text{Sec}[c]}{d}-\right.$$

$$\frac{2 \text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \text{Sin}\left[\frac{d x}{2}\right]-B \text{Sin}\left[\frac{d x}{2}\right]\right)}{d}+$$

$$\frac{4 A \text{Sec}[c] \text{Sec}[c+d x]^2 \text{Sin}[d x]}{3 d}+$$

$$\left.\frac{4 \text{Sec}[c] \text{Sec}[c+d x] \left(A \text{Sin}[c]-3 A \text{Sin}[d x]+3 B \text{Sin}[d x]\right)}{3 d}\right)-$$

$$\left(5 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\right.$$

$$\text{Sec}\left[\frac{c}{2}\right] \text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2} \text{Sin}[c] \text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

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

$$\Bigg(B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\;\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

$$\left(d\,(a+a\,\text{Cos}[c+d\,x])\,\sqrt{1+\text{Cot}[c]^2}\right)$$

Problem 151: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{7/2}\,(A+B\,\text{Cos}[c+d\,x])}{(a+a\,\text{Cos}[c+d\,x])^2}\,dx$$

Optimal (type 4, 203 leaves, 7 steps):

$$-\frac{7\,(5\,A-8\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{5\,a^2\,d}+\frac{5\,(2\,A-3\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a^2\,d}+$$

$$\frac{5\,(2\,A-3\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{3\,a^2\,d}-\frac{7\,(5\,A-8\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a^2\,d}+$$

$$\frac{(2\,A-3\,B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Cos}[c+d\,x])}+\frac{(A-B)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1262 leaves):

$$-\Bigg(\Bigg(7\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\right) \Big/$$

$$\left.\left.\left(-i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)\right)\right) \Big/$$

$$\left(2 \left(a+a \mathrm{Cos}[c+d x]\right)^2\right)\right)+\left(28 i B \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\right.$$

$$\mathrm{Csc}\left[\frac{c}{2}\right] \mathrm{Sec}\left[\frac{c}{2}\right]$$

$$\left(\left(2 e^{2 i d x} \mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{3}{4}, \frac{7}{4}, -e^{2 i d x} \left(\mathrm{Cos}[c]+i \mathrm{Sin}[c]\right)^2\right]\right.\right.$$

$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\right) \Big/$$

$$\left(3 i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)-$$

$$\left(2 \mathrm{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i d x} \left(\mathrm{Cos}[c]+i \mathrm{Sin}[c]\right)^2\right]\right.$$

$$\sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)}$$

$$\left.\sqrt{1+e^{2 i d x} \mathrm{Cos}[2 c]+i e^{2 i d x} \mathrm{Sin}[2 c]}\right) \Big/$$

$$\left.\left.\left(-i d \left(1+e^{2 i d x}\right) \mathrm{Cos}[c]+d \left(-1+e^{2 i d x}\right) \mathrm{Sin}[c]\right)\right)\right) \Big/$$

$$\left(5 \left(a+a \mathrm{Cos}[c+d x]\right)^2\right)-\left(20 A \mathrm{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\right.$$

$$\mathrm{Csc}\left[\frac{c}{2}\right]$$

$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4}, \frac{1}{2}\right\}, \left\{\frac{5}{4}\right\}, \mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$

$$\mathrm{Sec}\left[\frac{c}{2}\right] \mathrm{Sec}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$

$$\sqrt{1-\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2} \mathrm{Sin}[c] \mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$

$$\left.\sqrt{1+\mathrm{Sin}[d x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right) \Big/$$

$$\left(3 d \left(a+a \mathrm{Cos}[c+d x]\right)^2 \sqrt{1+\mathrm{Cot}[c]^2}\right)+$$

$$\left(10\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$
$$\mathrm{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]^2\right]$$
$$\mathrm{Sec}\left[\frac{c}{2}\right]$$
$$\mathrm{Sec}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]$$
$$\sqrt{1-\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\mathrm{Cot}[c]^2}\,\mathrm{Sin}[c]\,\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}$$
$$\left.\sqrt{1+\mathrm{Sin}[d\,x-\mathrm{ArcTan}[\mathrm{Cot}[c]]]}\right)\Big/$$
$$\left(d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2\sqrt{1+\mathrm{Cot}[c]^2}\right)+$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\mathrm{Cos}[c+d\,x]}\right.$$
$$\left(\frac{4\,(15\,A-20\,B+20\,A\,\mathrm{Cos}[c]-36\,B\,\mathrm{Cos}[c])\,\mathrm{Csc}[c]}{5\,d}+\frac{8\,(A-2\,B)\,\mathrm{Cos}[d\,x]\,\mathrm{Sin}[c]}{3\,d}+\right.$$
$$\frac{4\,B\,\mathrm{Cos}[2\,d\,x]\,\mathrm{Sin}[2\,c]}{5\,d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(3\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-4\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-$$
$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{8\,(A-2\,B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[d\,x]}{3\,d}+$$
$$\left.\left.\frac{4\,B\,\mathrm{Cos}[2\,c]\,\mathrm{Sin}[2\,d\,x]}{5\,d}-\frac{2\,(A-B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^2$$

Problem 152: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^{5/2}\,(A+B\,\mathrm{Cos}[c+d\,x])}{(a+a\,\mathrm{Cos}[c+d\,x])^2}\,dx$$

Optimal (type 4, 166 leaves, 6 steps):

$$\frac{(4\,A-7\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a^2\,d}-\frac{5\,(A-2\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a^2\,d}-\frac{5\,(A-2\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,a^2\,d}+\frac{(4\,A-7\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Cos}[c+d\,x])}+\frac{(A-B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Cos}[c+d\,x])^2}$$

Result (type 5, 1218 leaves):

$$\Bigg(2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$(a+a\,\text{Cos}[c+d\,x])^2-\Bigg(7\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-i\,d\,x}\,\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(2\,(a+a\,\text{Cos}[c+d\,x])^2\right)+$$

$$\Bigg(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\left.\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(20\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\left(-\frac{4\left(2\,A-3\,B+2\,A\,\text{Cos}[c]-4\,B\,\text{Cos}[c]\right)\text{Csc}[c]}{d}+\right.\right.$$

$$\frac{8\,B\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-3\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+$$

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

$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^2$$

Problem 153: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 4, 136 leaves, 5 steps):

$$-\frac{(A-4B)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{a^2 d}+\frac{(2A-5B)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{3a^2 d}+\frac{(2A-5B)\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{3a^2 d\,(1+\text{Cos}[c+dx])}+\frac{(A-B)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{3d\,(a+a\,\text{Cos}[c+dx])^2}$$

Result (type 5, 1184 leaves):

$$-\Bigg(\Bigg(\Bigg(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

$$\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/$$

$$\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

$$\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/$$

$$\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(2\left(a+a\,\text{Cos}[c+dx]\right)^2\right)\Bigg)+\Bigg(2\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4$$

$$\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

$$\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/$$

$$\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-$$

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

$$\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/$$

$$\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(a+a\,\text{Cos}[c+dx]\right)^2-$$

$$\Bigg(4\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$

$$\left.\text{Sin}[dx-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(10\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\right.$$

$$\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\left(-\frac{4\,(-A+2\,B+2\,B\,\text{Cos}[c])\,\text{Csc}[c]}{d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}-$$

$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\,(a+a\,\text{Cos}[c+d\,x])^2$$

Problem 154: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 4, 121 leaves, 5 steps):

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

Result (type 5, 815 leaves):

$$-\left(\left(\text{i}\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+\text{i}\,\text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,\text{i}\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+\text{i}\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,\text{i}\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,(\text{Cos}[c]+\text{i}\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,\text{i}\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+\text{i}\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left.\left(-\text{i}\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)\right)\Big/\left(2\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\right)\right)-$$
$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\right.\right.$$
$$\left.\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]}{\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}}\Bigg/\left(3 d\,(a+a\,\text{Cos}[c+d x])^2\sqrt{1+\text{Cot}[c]^2}\right)+$$

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

Problem 155: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 121 leaves, 5 steps):

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

Result (type 5, 815 leaves):

$$\Bigg(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

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

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\,e^{2 i d x}\,\text{Sin}[2 c]}\Bigg)\Bigg/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$

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

$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2 c]+i\, e^{2 i d x}\,\text{Sin}[2 c]}\,\Bigg)\Bigg/$$

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

$$\Bigg(4\, A\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\Bigg)\Bigg/$$

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

$$\Bigg(2\, B\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}\,\Bigg)\Bigg/$$

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

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\,\Bigg(-\frac{4\, A\, \text{Csc}[c]}{d}-\frac{4\, A\, \text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{d}-$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d x}{2}\right]-B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3\, d}-$$

$$\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\, d}\Bigg)\Bigg)\Bigg/\left(a+a\,\text{Cos}[c+d x]\right)^2$$

Problem 156: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{3/2}\left(a+a\,\text{Cos}[c+d x]\right)^2}\,dx$$

Optimal (type 4, 168 leaves, 6 steps):

$$-\frac{(4A-B)\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]}{a^2 d}-\frac{(5A-2B)\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]}{3a^2 d}+\frac{(4A-B)\,\text{Sin}[c+d x]}{a^2 d\sqrt{\text{Cos}[c+d x]}}-\frac{(5A-2B)\,\text{Sin}[c+d x]}{3a^2 d\sqrt{\text{Cos}[c+d x]}\,(1+\text{Cos}[c+d x])}-\frac{(A-B)\,\text{Sin}[c+d x]}{3d\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Cos}[c+d x])^2}$$

Result (type 5, 1217 leaves):

$$-\Bigg(\Bigg(2\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(a+a\,\text{Cos}[c+d x]\right)^2\Bigg)+\Bigg(i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4$$
$$\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(3\,i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\,\text{Cos}[2c]+i\,e^{2 i d x}\,\text{Sin}[2c]}\Bigg)\Big/$$
$$\left(-i\,d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(2\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\right)+\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\right.$$

$$\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\right.$$

$$\left.\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\right.$$

$$\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\left(\frac{2\,\left(2\,A+2\,A\,\text{Cos}[c]-B\,\text{Cos}[c]\right)\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[c]}{d}+\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(2\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}+\frac{8\,A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}+$$
$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^2$$

Problem 157: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}\,dx$$

Optimal (type 4, 201 leaves, 7 steps):

$$\frac{(7\,A-4\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{a^2\,d}+\frac{5\,(2\,A-B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{3\,a^2\,d}+$$
$$\frac{5\,(2\,A-B)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}}-\frac{(7\,A-4\,B)\,\text{Sin}[c+d\,x]}{a^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}-$$
$$\frac{(7\,A-4\,B)\,\text{Sin}[c+d\,x]}{3\,a^2\,d\,\text{Cos}[c+d\,x]^{3/2}\,(1+\text{Cos}[c+d\,x])}-\frac{(A-B)\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}$$

Result (type 5, 1258 leaves):

$$\left(7\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(2\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2\right)-\left(2\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\Big)\Big)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^2-$$
$$\left(20\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.\right.$$
$$\left.\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\left(a+a\,\text{Cos}[c+d\,x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(10\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\left(a+a\,\text{Cos}[c+d\,x]\right)^2\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\left(-\frac{2\left(4\,A-2\,B+3\,A\,\text{Cos}[c]-2\,B\,\text{Cos}[c]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{d}-\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(3\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-2\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{d}-$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\frac{8\,A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+$$
$$\frac{8\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\left(A\,\text{Sin}[c]-6\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x]\right)}{3\,d}-$$
$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^2$$

Problem 158: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{9/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 254 leaves, 8 steps):

$$-\frac{7\,(17\,A-33\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+$$
$$\frac{(11\,A-21\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{2\,a^3\,d}+\frac{(11\,A-21\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,a^3\,d}-$$
$$\frac{7\,(17\,A-33\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{30\,a^3\,d}+\frac{(A-B)\,\text{Cos}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}+$$
$$\frac{(7\,A-12\,B)\,\text{Cos}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}+\frac{3\,(11\,A-21\,B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1346 leaves):

$$-\left(\left(119\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left.\left(10\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)\right)+\left(231\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\text{Csc}\Big[$$

$$\frac{c}{2}]\ \text{Sec}[\frac{c}{2}]$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(3\,i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\Big]\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)-\Bigg(22\,A\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\,\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

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

$$\Bigg(42\,B\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^6\,\text{Csc}\Big[\frac{c}{2}\Big]\,\text{HypergeometricPFQ}\Big[\Big\{\frac{1}{4},\frac{1}{2}\Big\},\Big\{\frac{5}{4}\Big\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\Big]\,\text{Sec}\Big[\frac{c}{2}\Big]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\frac{1}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3}\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}$$
$$\left(\frac{4\,\left(59\,A-99\,B+60\,A\,\text{Cos}[c]-132\,B\,\text{Cos}[c]\right)\,\text{Csc}[c]}{5\,d}+\right.$$
$$\frac{16\,\left(A-3\,B\right)\,\text{Cos}[d\,x]\,\text{Sin}[c]}{3\,d}+\frac{8\,B\,\text{Cos}[2\,d\,x]\,\text{Sin}[2\,c]}{5\,d}+$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\left(59\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-99\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\left(19\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-24\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$
$$\frac{16\,\left(A-3\,B\right)\,\text{Cos}[c]\,\text{Sin}[d\,x]}{3\,d}+\frac{8\,B\,\text{Cos}[2\,c]\,\text{Sin}[2\,d\,x]}{5\,d}-$$
$$\left.\frac{4\,\left(19\,A-24\,B\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,\left(A-B\right)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 159: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{7/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 219 leaves, 7 steps):

$$\frac{7\left(7 A-17 B\right) \text{EllipticE}\left[\frac{1}{2}\left(c+d x\right),2\right]}{10 a^3 d}-\frac{\left(13 A-33 B\right) \text{EllipticF}\left[\frac{1}{2}\left(c+d x\right),2\right]}{6 a^3 d}-$$
$$\frac{\left(13 A-33 B\right) \sqrt{\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{6 a^3 d}+\frac{(A-B)\ \text{Cos}[c+d x]^{7/2}\ \text{Sin}[c+d x]}{5 d\left(a+a \text{Cos}[c+d x]\right)^3}+$$
$$\frac{\left(A-2 B\right) \text{Cos}[c+d x]^{5/2}\ \text{Sin}[c+d x]}{3 a d\left(a+a \text{Cos}[c+d x]\right)^2}+\frac{7\left(7 A-17 B\right) \text{Cos}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{30 d\left(a^3+a^3 \text{Cos}[c+d x]\right)}$$

Result (type 5, 1306 leaves):

$$\Bigg(49\, i\, A\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\, \text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\, \text{Cos}[2 c]+i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\, \text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\, \text{Cos}[2 c]+i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-i d\left(1+e^{2 i d x}\right) \text{Cos}[c]+d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(10\left(a+a\, \text{Cos}[c+d x]\right)^3\right)-\Bigg(119\, i\, B\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\, e^{2 i d x}\, \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\, \text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\, \text{Cos}[2 c]+i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-$$
$$\Bigg(2\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\, \text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\, \text{Cos}[2 c]+i\, e^{2 i d x}\, \text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-i d\left(1+e^{2 i d x}\right) \text{Cos}[c]+d\left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(10\left(a+a\, \text{Cos}[c+d x]\right)^3\right)+$$
$$\Bigg(26\, A\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.$$
$$\left.\text{Sin}\left[d x-\text{ArcTan}[\text{Cot}[c]]\right]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[d x-\text{ArcTan}[\text{Cot}[c]]\right]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(22\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\left(-\frac{4\,\left(29\,A-59\,B+20\,A\,\text{Cos}[c]-60\,B\,\text{Cos}[c]\right)\text{Csc}[c]}{5\,d}+\right.\right.$$
$$\frac{16\,B\,\text{Cos}[d\,x]\ \text{Sin}[c]}{3\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(29\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-59\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(14\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-19\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{16\,B\,\text{Cos}[c]\ \text{Sin}[d\,x]}{3\,d}+$$
$$\left.\left.\frac{4\,(14\,A-19\,B)\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,(A-B)\ \text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^3$$

Problem 160: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 188 leaves, 6 steps):

$$-\frac{(9A-49B)\,\text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]}{10a^3d}+\frac{(3A-13B)\,\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]}{6a^3d}+\frac{(A-B)\,\text{Cos}[c+dx]^{5/2}\,\text{Sin}[c+dx]}{5d\,(a+a\,\text{Cos}[c+dx])^3}+\frac{(3A-8B)\,\text{Cos}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{15ad\,(a+a\,\text{Cos}[c+dx])^2}+\frac{(3A-13B)\,\sqrt{\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{6d\,(a^3+a^3\,\text{Cos}[c+dx])}$$

Result (type 5, 1273 leaves):

$$-\Bigg(\Bigg(9\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\left(10\left(a+a\,\text{Cos}[c+dx]\right)^3\right)\Bigg)+\Bigg(49\,i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\Bigg(\Bigg(2\,e^{2idx}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(3\,i\,d\left(1+e^{2idx}\right)\text{Cos}[c]-3d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)-\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2idx}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\sqrt{e^{-idx}\left(2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\sqrt{1+e^{2idx}\,\text{Cos}[2c]+i\,e^{2idx}\,\text{Sin}[2c]}\Bigg)\Big/\left(-i\,d\left(1+e^{2idx}\right)\text{Cos}[c]+d\left(-1+e^{2idx}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)-\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$

$$\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\right.$$

$$\left.\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(26\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\left(-\frac{4\,(-9\,A+29\,B+20\,B\,\text{Cos}[c])\,\text{Csc}[c]}{5\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-29\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-14\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{4\,(9\,A-14\,B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+$$
$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^3$$

Problem 161: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3}\,dx$$

Optimal (type 4, 180 leaves, 6 steps):

$$-\frac{(A+9\,B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+$$
$$\frac{(A+3\,B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}+\frac{(A-B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3}+$$
$$\frac{(A-6\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^2}+\frac{(A+9\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,\left(a^3+a^3\,\text{Cos}[c+d\,x]\right)}$$

Result (type 5, 1265 leaves):

$$-\left(\left(\text{i}\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.\right.$$
$$\left(\left(2\,e^{2\,\text{i}\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,\text{i}\,d\,x}\,\left(\text{Cos}[c]+\text{i}\,\text{Sin}[c]\right)^2\right]\right.\right.$$
$$\sqrt{e^{-\text{i}\,d\,x}\,\left(2\,\left(1+e^{2\,\text{i}\,d\,x}\right)\,\text{Cos}[c]+2\,\text{i}\,\left(-1+e^{2\,\text{i}\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,\text{i}\,d\,x}\,\text{Cos}[2\,c]+\text{i}\,e^{2\,\text{i}\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,\text{i}\,d\,\left(1+e^{2\,\text{i}\,d\,x}\right)\,\text{Cos}[c]-3\,d\,\left(-1+e^{2\,\text{i}\,d\,x}\right)\,\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,\text{i}\,d\,x}\,\left(\text{Cos}[c]+\text{i}\,\text{Sin}[c]\right)^2\right]\right.$$
$$\sqrt{e^{-\text{i}\,d\,x}\,\left(2\,\left(1+e^{2\,\text{i}\,d\,x}\right)\,\text{Cos}[c]+2\,\text{i}\,\left(-1+e^{2\,\text{i}\,d\,x}\right)\,\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,\text{i}\,d\,x}\,\text{Cos}[2\,c]+\text{i}\,e^{2\,\text{i}\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-\text{i}\,d\,\left(1+e^{2\,\text{i}\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,\text{i}\,d\,x}\right)\,\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left.\left(10\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)\right)-\left(9\,\text{i}\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$
$$\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.\right.$$

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

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

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

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]\right.$$

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

$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$

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

$$\left(10\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)-\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\right.$$

$$\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\right.$$

$$\left.\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$

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

$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Bigg/$$
$$\left(d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}$$
$$\Bigg(\frac{4\,(A+9\,B)\,\text{Csc}[c]}{5\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(4\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{4\,(4\,A-9\,B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-$$
$$\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\Bigg)\Bigg)\Bigg/\,(a+a\,\text{Cos}[c+d\,x])^3$$

Problem 162: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 178 leaves, 6 steps):

$$\frac{(A-B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{10\,a^3\,d}+$$
$$\frac{(A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]}{6\,a^3\,d}+\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}+$$
$$\frac{(A+4\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{10\,d\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1264 leaves):

$$\Bigg(i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]$$
$$\sqrt{e^{-i\,d\,x}\left(2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Bigg/$$
$$\left(3\,i\,d\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]-3\,d\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\right)-$$

$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\right)\Big/$$
$$\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)-\left(i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left(3\,i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]-3\,d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)-$$
$$\left(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.$$
$$\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$
$$\left.\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\right)\Big/$$
$$\left.\left.\left(-i\,d\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+d\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)\right)\right)\Big/\left(10\,(a+a\,\text{Cos}[c+d\,x])^3\right)-$$
$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\right.\right.$$
$$\left.\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\,\sqrt{1+\text{Cot}[c]^2}\right)-$$
$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\ \text{Sin}[c]\ \text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\left(-\frac{4\,(A-B)\,\text{Csc}[c]}{5\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\right.$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]+4\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+\frac{4\,(A+4\,B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+$$
$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\ (a+a\,\text{Cos}[c+d\,x])^3$$

Problem 163: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 4, 182 leaves, 6 steps):

$$\frac{(9\,A+B)\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]}{10\,a^3\,d}+$$
$$\frac{(3\,A+B)\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]}{6\,a^3\,d}-\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Cos}[c+d\,x])^3}-$$
$$\frac{(6\,A-B)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(9\,A+B)\,\sqrt{\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{10\,d\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1265 leaves):

$$\left(9\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$
$$\sqrt{e^{-i\,d\,x}\,\left(2\,\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)}$$

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$

$$\left(10\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)+\Bigg(i\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$

$$\Bigg(\Bigg(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\,\frac{3}{4},\,\frac{7}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

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

$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,d\,x}\,\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$

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

$$\sqrt{1+e^{2\,i\,d\,x}\,\text{Cos}[2\,c]+i\,e^{2\,i\,d\,x}\,\text{Sin}[2\,c]}\Bigg)\Big/$$

$$\left(-i\,d\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+d\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)\Bigg)\Bigg)\Big/\,\left(10\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)-$$

$$\Bigg(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\right.$$

$$\left.\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$

$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\Bigg)\Big/$$

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

$$\Bigg(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\,\text{Csc}\left[\frac{c}{2}\right]$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\,\frac{1}{2}\right\},\,\left\{\frac{5}{4}\right\},\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\;\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Bigg/$$
$$\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\left(-\frac{4\,(9\,A+B)\,\text{Csc}[c]}{5\,d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(6\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(9\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]+B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-\frac{4\,(6\,A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}-$$
$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Bigg/\left(a+a\,\text{Cos}[c+d\,x]\right)^3$$

Problem 164: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 4, 221 leaves, 7 steps):

$$-\frac{(49\,A-9\,B)\,\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]}{10\,a^3\,d}-\frac{(13\,A-3\,B)\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]}{6\,a^3\,d}+$$
$$\frac{(49\,A-9\,B)\,\text{Sin}[c+d\,x]}{10\,a^3\,d\sqrt{\text{Cos}[c+d\,x]}}-\frac{(A-B)\,\text{Sin}[c+d\,x]}{5\,d\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3}-$$
$$\frac{(8\,A-3\,B)\,\text{Sin}[c+d\,x]}{15\,a\,d\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^2}-\frac{(13\,A-3\,B)\,\text{Sin}[c+d\,x]}{6\,d\sqrt{\text{Cos}[c+d\,x]}\,(a^3+a^3\,\text{Cos}[c+d\,x])}$$

Result (type 5, 1305 leaves):

$$-\left(\left(49\,i\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\right.\right.$$
$$\left(\left(2\,e^{2\,i\,d\,x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2\,i\,d\,x}\,(\text{Cos}[c]+i\,\text{Sin}[c])^2\right]\right.\right.$$

$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(10\left(a+a\,\text{Cos}[c+d x]\right)^3\right)\Bigg)+\Bigg(9 i B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$
$$\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]$$
$$\Bigg(\Bigg(2 e^{2 i d x}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(3 i d\left(1+e^{2 i d x}\right)\text{Cos}[c]-3 d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)-$$
$$\Bigg(2\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x}\left(\text{Cos}[c]+i\,\text{Sin}[c]\right)^2\right]$$
$$\sqrt{e^{-i d x}\left(2\left(1+e^{2 i d x}\right)\text{Cos}[c]+2 i\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)}$$
$$\sqrt{1+e^{2 i d x}\text{Cos}[2 c]+i e^{2 i d x}\text{Sin}[2 c]}\Bigg)\Big/$$
$$\left(-i d\left(1+e^{2 i d x}\right)\text{Cos}[c]+d\left(-1+e^{2 i d x}\right)\text{Sin}[c]\right)\Bigg)\Bigg)\Big/$$
$$\left(10\left(a+a\,\text{Cos}[c+d x]\right)^3\right)+\Bigg(26 A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6$$
$$\text{Csc}\left[\frac{c}{2}\right]$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(3\,d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)-$$

$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]$$

$$\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]\,\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$

$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/\left(d\,(a+a\,\text{Cos}[c+d\,x])^3\sqrt{1+\text{Cot}[c]^2}\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\left(\frac{2\,(20\,A+29\,A\,\text{Cos}[c]-9\,B\,\text{Cos}[c])\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]}{5\,d}+\right.$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(29\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-9\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+$$

$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(11\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-6\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}+$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{16\,A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\,\text{Sin}[d\,x]}{d}+$$

$$\left.\left.\frac{4\,(11\,A-6\,B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^3$$

Problem 165: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])^3}\,dx$$

Optimal (type 4, 254 leaves, 8 steps):

$$\frac{7 (17 A-7 B) \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right]}{10 a^3 d}+\frac{(33 A-13 B) \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right]}{6 a^3 d}+\frac{(33 A-13 B) \text{Sin}[c+d x]}{6 a^3 d \text{Cos}[c+d x]^{3/2}}-\frac{7 (17 A-7 B) \text{Sin}[c+d x]}{10 a^3 d \sqrt{\text{Cos}[c+d x]}}-\frac{(A-B) \text{Sin}[c+d x]}{5 d \text{Cos}[c+d x]^{3/2} (a+a \text{Cos}[c+d x])^3}-\frac{(2 A-B) \text{Sin}[c+d x]}{3 a d \text{Cos}[c+d x]^{3/2} (a+a \text{Cos}[c+d x])^2}-\frac{7 (17 A-7 B) \text{Sin}[c+d x]}{30 d \text{Cos}[c+d x]^{3/2} \left(a^3+a^3 \text{Cos}[c+d x]\right)}$$

Result (type 5, 1346 leaves):

$$\Bigg(119 i A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Big/ \left(10 (a+a \text{Cos}[c+d x])^3\right)-\Bigg(49 i B \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}\right] \Bigg(\Bigg(2 e^{2 i d x} \text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(3 i d \left(1+e^{2 i d x}\right) \text{Cos}[c]-3 d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)-\Bigg(2 \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i d x} (\text{Cos}[c]+i \text{Sin}[c])^2\right] \sqrt{e^{-i d x} \left(2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)} \sqrt{1+e^{2 i d x} \text{Cos}[2 c]+i e^{2 i d x} \text{Sin}[2 c]}\Bigg) \Big/ \left(-i d \left(1+e^{2 i d x}\right) \text{Cos}[c]+d \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)\Bigg)\Bigg) \Big/ \left(10 (a+a \text{Cos}[c+d x])^3\right)-$$

$$\Bigg(22 A \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$

$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\left(26\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\text{HypergeometricPFQ}\left[\left\{\frac{1}{4},\frac{1}{2}\right\},\left\{\frac{5}{4}\right\},\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]^2\right]$$
$$\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[d\,x-\text{ArcTan}[\text{Cot}[c]]]$$
$$\sqrt{1-\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\sqrt{-\sqrt{1+\text{Cot}[c]^2}\,\text{Sin}[c]\,\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}$$
$$\left.\sqrt{1+\text{Sin}[d\,x-\text{ArcTan}[\text{Cot}[c]]]}\right)\Big/$$
$$\left(3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\sqrt{1+\text{Cot}[c]^2}\right)+$$
$$\frac{1}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3}$$
$$\text{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6$$
$$\sqrt{\text{Cos}[c+d\,x]}$$
$$\left(-\frac{1}{5\,d}2\,\left(60\,A-20\,B+59\,A\,\text{Cos}[c]-29\,B\,\text{Cos}[c]\right)\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]\text{Sec}[c]-\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\left(59\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-29\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}-$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\left(16\,A\,\text{Sin}\left[\frac{d\,x}{2}\right]-11\,B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{15\,d}-$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\left(A\,\text{Sin}\left[\frac{d\,x}{2}\right]-B\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)}{5\,d}+\frac{16\,A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,\text{Sin}[d\,x]}{3\,d}+$$
$$\frac{16\,\text{Sec}[c]\,\text{Sec}[c+d\,x]\left(A\,\text{Sin}[c]-9\,A\,\text{Sin}[d\,x]+3\,B\,\text{Sin}[d\,x]\right)}{3\,d}-$$

$$\left.\frac{4\,(16\,A-11\,B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\,\mathrm{Tan}\left[\frac{c}{2}\right]}{15\,d}-\frac{2\,(A-B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\,\mathrm{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)$$

Problem 166: Result unnecessarily involves imaginary or complex numbers.

$$\int \mathrm{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 3, 221 leaves, 6 steps):

$$\frac{5\,\sqrt{a}\,(8\,A+7\,B)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{64\,d}+\frac{5\,a\,(8\,A+7\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{5\,a\,(8\,A+7\,B)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{96\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{a\,(8\,A+7\,B)\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{a\,B\,\mathrm{Cos}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 330 leaves):

$$\frac{1}{768\,d}\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\left(15\,i\,(8\,A+7\,B)\,e^{\frac{i\,d\,x}{2}}\left(\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right]-\mathrm{Log}\left[2\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right)\right]\right)\sqrt{e^{-i\,d\,x}\left(2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}\right)\Big/\left(\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right)+4\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(152\,A+133\,B+2\,(40\,A+53\,B)\,\mathrm{Cos}[c+d\,x]+4\,(8\,A+7\,B)\,\mathrm{Cos}[2\,(c+d\,x)]+12\,B\,\mathrm{Cos}[3\,(c+d\,x)]\right)\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 167: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \mathrm{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 3, 176 leaves, 5 steps):

$$\frac{\sqrt{a}\,(6\,A+5\,B)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a\,(6\,A+5\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{a\,(6\,A+5\,B)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{a\,B\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 620 leaves):

$$\frac{1}{48\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\left(-3\,i\,\left(6\,A+5\,B\right)\,\text{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$
$$3\,i\,\left(6\,A+5\,B\right)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]$$
$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+18\,A\,\text{Log}\left[\right.$$
$$\left.2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$15\,B\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{d\,x}{2}\right]+24\,\sqrt{2}\,\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$
$$28\,\sqrt{2}\,\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$
$$12\,\sqrt{2}\,\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]+$$
$$6\,\sqrt{2}\,\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]+$$
$$\left.4\,\sqrt{2}\,\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{5}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 168: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 3, 131 leaves, 4 steps):

$$\frac{\sqrt{a}\,\,\left(4\,A+3\,B\right)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d}+$$
$$\frac{a\,\left(4\,A+3\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,B\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 536 leaves):

$$\frac{1}{8\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}$$

$$\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\,\text{Sec}\Big[\frac{1}{2}\,\left(c+d\,x\right)\Big]\,\Bigg(-i\,\left(4\,A+3\,B\right)\,\text{Cos}\Big[\frac{d\,x}{2}\Big]$$

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

$$i\,\left(4\,A+3\,B\right)\,\text{ArcTanh}\Big[\Big(\text{Cos}\Big[\frac{c}{2}\Big]+i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\Big]$$

$$\Big(\text{Cos}\Big[\frac{d\,x}{2}\Big]+i\,\text{Sin}\Big[\frac{d\,x}{2}\Big]\Big)+4\,A\,\text{Log}\Big[$$

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

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

$$\text{Sin}\Big[\frac{d\,x}{2}\Big]+8\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\Big[\frac{1}{2}\,\left(c+d\,x\right)\Big]+$$

$$4\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\Big[\frac{1}{2}\,\left(c+d\,x\right)\Big]+$$

$$2\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\Big[\frac{3}{2}\,\left(c+d\,x\right)\Big]\Bigg)$$

Problem 169: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 78 leaves, 3 steps):

$$\frac{\sqrt{a}\,\left(2\,A+B\right)\,\text{ArcSin}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\Big]}{d}+\frac{a\,B\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 447 leaves):

$$\frac{1}{2\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-i\,(2\,A+B)\,\text{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$
$$i\,(2\,A+B)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]$$
$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+2\,A\,\text{Log}\Big[$$
$$2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\Big]\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$B\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$
$$\left.\text{Sin}\left[\frac{d\,x}{2}\right]+2\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 170: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 76 leaves, 3 steps):

$$\frac{2\,\sqrt{a}\,B\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}+\frac{2\,a\,A\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 294 leaves):

$$\frac{1}{\sqrt{2}\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}}$$
$$\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)$$
$$\left(i\,B\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]\,\text{Cos}[c+d\,x]-\right.$$
$$i\,B\,\text{Cos}[c+d\,x]$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$
$$\left.2\,\sqrt{2}\,A\,\left(\text{Cos}\left[\frac{d\,x}{2}\right]-i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 174: Result unnecessarily involves imaginary or complex numbers.

$$\int\text{Cos}[c+d\,x]^{3/2}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 3, 227 leaves, 6 steps):

$$\frac{a^{3/2}\,(88\,A+75\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{64\,d}+\frac{a^2\,(88\,A+75\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,(88\,A+75\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{96\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,(8\,A+9\,B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,B\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 3, 356 leaves):

$$-\frac{1}{768\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\left(a\,(1+\text{Cos}[c+d\,x])\right)^{3/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\Bigg(-3\,i\,(88\,A+75\,B)\,e^{\frac{i\,d\,x}{2}}$$
$$\Bigg(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]-$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right)\right]\Bigg)$$
$$\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\,-$$
$$4\,\sqrt{\text{Cos}[c+d\,x]}\,\left(296\,A+285\,B+2\,(88\,A+93\,B)\,\text{Cos}[c+d\,x]+4\,(8\,A+15\,B)\,\text{Cos}[2\,(c+d\,x)]+\right.$$
$$\left.12\,B\,\text{Cos}[3\,(c+d\,x)]\right)\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)$$

Problem 175: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 3, 180 leaves, 5 steps):

$$\frac{a^{3/2}\,(14\,A+11\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a^2\,(14\,A+11\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^2\,(6\,A+7\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a\,B\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 621 leaves):

$$\frac{1}{48\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}}\,a\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a\,\left(1+\mathrm{Cos}[c+d\,x]\right)}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-3\,i\,(14\,A+11\,B)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\right)\right]+$$
$$3\,i\,(14\,A+11\,B)\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\,\right]$$
$$\left(\mathrm{Cos}\left[\frac{d\,x}{2}\right]+i\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)+42\,A\,\mathrm{Log}\Big[$$
$$2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\right)\Big]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+$$
$$33\,B\,\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\mathrm{Sin}[c]}\right)\right]$$
$$\mathrm{Sin}\left[\frac{d\,x}{2}\right]+72\,\sqrt{2}\,A\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$52\,\sqrt{2}\,B\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$12\,\sqrt{2}\,A\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$
$$18\,\sqrt{2}\,B\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$
$$\left.4\,\sqrt{2}\,B\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{5}{2}\,(c+d\,x)\right]\right)$$

Problem 176: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]\right)}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 133 leaves, 4 steps):

$$\frac{a^{3/2}\,(12\,A+7\,B)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{4\,d}+\frac{a^2\,(4\,A+5\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+$$
$$\frac{a\,B\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{2\,d}$$

Result (type 3, 537 leaves):

$$\frac{1}{8\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}}$$
$$a\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a\,\left(1+\mathrm{Cos}[c+d\,x]\right)}\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\left(-i\,(12\,A+7\,B)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right)\right]+$$
$$i\,(12\,A+7\,B)\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right]$$
$$\left(\mathrm{Cos}\left[\frac{d\,x}{2}\right]+i\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)+12\,A\,\mathrm{Log}\Big[$$
$$2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right)\Big]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+$$
$$7\,B\,\mathrm{Log}\left[2\,\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right)\right]$$
$$\mathrm{Sin}\left[\frac{d\,x}{2}\right]+8\,\sqrt{2}\,A\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$12\,\sqrt{2}\,B\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$\left.2\,\sqrt{2}\,B\,\sqrt{\mathrm{Cos}[c+d\,x]\,\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\right)$$

Problem 177: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]\right)}{\mathrm{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 126 leaves, 4 steps):

$$\frac{a^{3/2}\,(2\,A+3\,B)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{d}-\frac{a^2\,(2\,A-B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 869 leaves):

$$\frac{1}{4}\left(2A+3B\right)\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3$$
$$\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{idx}{2}}\,\text{Log}\left[2\left(e^{idx}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\,\text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right]$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-idx}\left(\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\Bigg)-$$
$$\left(2\,i\,e^{\frac{idx}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\,\right]\right.$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-idx}\left(\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\Bigg)+$$
$$\frac{1}{2}\text{Cos}\left[\frac{c}{2}\right]\left(-\left(\left(2\,i\,e^{\frac{idx}{2}}\,\text{Log}\left[2\left(e^{idx}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{idx}\,\text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\right]$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-idx}\left(\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\Bigg)+$$
$$\left(2\,i\,e^{\frac{idx}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]}\,\right]\right.$$
$$\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-idx}\left(\left(1+e^{2idx}\right)\text{Cos}[c]+i\left(-1+e^{2idx}\right)\text{Sin}[c]\right)}\Bigg)\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2idx}\right)\text{Cos}[c]+2\,i\left(-1+e^{2idx}\right)\text{Sin}[c]}\right)\Bigg)\Bigg)+$$
$$\sqrt{\text{Cos}[c+dx]}\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{3/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3$$
$$\left(\frac{B\,\text{Cos}\left[\frac{dx}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{2d}+\frac{B\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]}{2d}+\frac{A\,\text{Sec}[c+dx]\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]}{d}\right)$$

Problem 178: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\text{Cos}[c+dx]\right)^{3/2}\left(A+B\,\text{Cos}[c+dx]\right)}{\text{Cos}[c+dx]^{5/2}}\,dx$$

Optimal (type 3, 125 leaves, 4 steps):

$$\frac{2\,a^{3/2}\,B\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}+\frac{2\,a^2\,(4\,A+3\,B)\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 3, 702 leaves):

$$\frac{1}{12\,\sqrt{2}\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}}$$
$$(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3$$
$$\left(\frac{3}{2}\,i\,B\,e^{-\frac{3}{2}\,i\,d\,x}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right]\right.$$
$$\text{Cos}\left[\frac{c}{2}\right]^2\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)^2-\frac{3}{2}\,i\,B\,e^{-\frac{3}{2}\,i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]^2$$
$$\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right]$$
$$\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)^2+$$
$$\frac{3}{2}\,i\,B\,e^{-\frac{3}{2}\,i\,d\,x}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right]$$
$$\text{Sin}\left[\frac{c}{2}\right]^2\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)^2-\frac{3}{2}\,i\,B\,e^{-\frac{3}{2}\,i\,d\,x}$$
$$\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{c}{2}\right]^2\left(\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]\right)^2+$$
$$4\,A\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$20\,A\,\text{Cos}[c+d\,x]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$\left.12\,B\,\text{Cos}[c+d\,x]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\text{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\text{Sin}[c]}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 182: Result unnecessarily involves imaginary or complex numbers.

$$\int \text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])\,dx$$

Optimal (type 3, 274 leaves, 7 steps):

$$\frac{a^{5/2}\,(326\,A+283\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{128\,d}+\frac{a^3\,(326\,A+283\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^3\,(326\,A+283\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^3\,(170\,A+157\,B)\,\text{Cos}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{240\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(10\,A+13\,B)\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{40\,d}+$$
$$\frac{a\,B\,\text{Cos}[c+d\,x]^{5/2}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 377 leaves):

$$-\frac{1}{15\,360\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}$$
$$\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\Bigg(-15\,i\,(326\,A+283\,B)\,e^{\frac{i\,d\,x}{2}}$$
$$\Bigg(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]-$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\Bigg)$$
$$\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\,-4\,\sqrt{\text{Cos}[c+d\,x]}$$
$$\big(5810\,A+5521\,B+(3620\,A+3874\,B)\,\text{Cos}[c+d\,x]+4\,(230\,A+331\,B)\,\text{Cos}[2\,(c+d\,x)]+$$
$$120\,A\,\text{Cos}[3\,(c+d\,x)]+348\,B\,\text{Cos}[3\,(c+d\,x)]+48\,B\,\text{Cos}[4\,(c+d\,x)]\big)$$
$$\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)$$

Problem 183: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])\,dx$$

Optimal (type 3, 227 leaves, 6 steps):

$$\frac{a^{5/2}\,(200\,A+163\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{64\,d}+$$
$$\frac{a^3\,(200\,A+163\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{64\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{a^3\,(104\,A+95\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{96\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{a^2\,(8\,A+11\,B)\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d}+$$
$$\frac{a\,B\,\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 3, 355 leaves):

$$-\frac{1}{1536\,d\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}}\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^{5}\left(-3\,i\left(200\,A+163\,B\right)e^{\frac{i\,d\,x}{2}}\right.$$
$$\left(\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right]-\right.$$
$$\left.\mathrm{Log}\left[2\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right)\right]\right)$$
$$\sqrt{e^{-i\,d\,x}\left(\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)}-$$
$$4\sqrt{\mathrm{Cos}[c+d\,x]}\left(632\,A+581\,B+\left(272\,A+362\,B\right)\mathrm{Cos}[c+d\,x]+4\left(8\,A+23\,B\right)\mathrm{Cos}\left[2\left(c+d\,x\right)\right]+\right.$$
$$\left.\left.12\,B\,\mathrm{Cos}\left[3\left(c+d\,x\right)\right]\right)\sqrt{\mathrm{Cos}[c+d\,x]\left(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x]\right)}\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right)$$

Problem 184: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\mathrm{Cos}[c+d\,x]\right)}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 180 leaves, 5 steps):

$$\frac{a^{5/2}\left(38\,A+25\,B\right)\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{8\,d}+\frac{a^{3}\left(54\,A+49\,B\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{24\,d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+$$
$$\frac{a^{2}\left(2\,A+3\,B\right)\sqrt{\mathrm{Cos}[c+d\,x]}\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{4\,d}+$$
$$\frac{a\,B\sqrt{\mathrm{Cos}[c+d\,x]}\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\mathrm{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 623 leaves):

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

$$a^2\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\left(-3\,i\,\left(38\,A+25\,B\right)\,\text{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$
$$3\,i\,\left(38\,A+25\,B\right)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]$$
$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+114\,A\,\text{Log}\left[\right.$$
$$\left.2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$75\,B\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{d\,x}{2}\right]+120\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$
$$124\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$
$$12\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]+$$
$$30\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]+$$
$$\left.4\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{5}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 185: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 178 leaves, 5 steps):

$$\frac{a^{5/2}\,\left(20\,A+19\,B\right)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{4\,d}-\frac{a^3\,\left(4\,A-9\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-$$
$$\frac{a^2\,\left(4\,A-B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{2\,d}+$$
$$\frac{2\,a\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 3, 335 leaves):

$$-\frac{1}{32\,d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\,\Bigg(-i\,\left(20\,A+19\,B\right)\,e^{\frac{i\,d\,x}{2}}$$
$$\left(\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\,\right]-\right.$$
$$\left.\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]\right)$$
$$\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}-\frac{1}{\sqrt{\text{Cos}[c+d\,x]}}$$
$$4\,\left(8\,A+B+\left(4\,A+11\,B\right)\,\text{Cos}[c+d\,x]+B\,\text{Cos}\left[2\,(c+d\,x)\right]\right)$$
$$\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)$$

Problem 186: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 173 leaves, 5 steps):

$$\frac{a^{5/2}\,\left(2\,A+5\,B\right)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{d}-\frac{a^3\,\left(14\,A+3\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,a^2\,\left(2\,A+B\right)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,a\,A\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 3, 920 leaves):

$$\frac{1}{8}\left(2A+5B\right)\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{5/2}\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5$$
$$\left(\frac{1}{2}\,\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\left(-\left(\left(2\,\text{i}\,e^{\frac{\text{i}dx}{2}}\,\text{Log}\left[2\left(e^{\text{i}dx}\,\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,e^{\text{i}dx}\,\text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]}\right)\right]$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\text{i}dx}\left(\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\sqrt{2\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]}\right)\right)-$$
$$\left(2\,\text{i}\,e^{\frac{\text{i}dx}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\text{i}dx}\left(\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\sqrt{2\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]}\right)\right)+$$
$$\frac{1}{2}\,\text{Cos}\left[\frac{c}{2}\right]\left(-\left(\left(2\,\text{i}\,e^{\frac{\text{i}dx}{2}}\,\text{Log}\left[2\left(e^{\text{i}dx}\,\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,e^{\text{i}dx}\,\text{Sin}\left[\frac{c}{2}\right]+\right.\right.\right.\right.$$
$$\left.\left.\sqrt{\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]}\right)\right]$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\text{i}dx}\left(\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\sqrt{2\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]}\right)\right)+$$
$$\left(2\,\text{i}\,e^{\frac{\text{i}dx}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+\text{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\text{i}dx}\left(\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left.\left(d\sqrt{2\left(1+e^{2\text{i}dx}\right)\text{Cos}[c]+2\,\text{i}\left(-1+e^{2\text{i}dx}\right)\text{Sin}[c]}\right)\right)\right)+$$
$$\sqrt{\text{Cos}[c+dx]}\left(a\left(1+\text{Cos}[c+dx]\right)\right)^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5$$
$$\left(\frac{B\,\text{Cos}\left[\frac{dx}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{4d}+\frac{B\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]}{4d}+\right.$$
$$\frac{A\,\text{Sec}[c+dx]^2\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]}{6d}+$$
$$\left.\frac{\text{Sec}[c+dx]\left(8A\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]+3B\,\text{Sin}\left[\frac{c}{2}+\frac{dx}{2}\right]\right)}{6d}\right)$$

Problem 187: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + a \operatorname{Cos}[c + d x])^{5/2} (A + B \operatorname{Cos}[c + d x])}{\operatorname{Cos}[c + d x]^{7/2}} \, dx$$

Optimal (type 3, 172 leaves, 5 steps):

$$\frac{2 a^{5/2} B \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{d} + \frac{2 a^3 (32 A + 35 B) \operatorname{Sin}[c + d x]}{15 d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}} + \frac{2 a^2 (8 A + 5 B) \sqrt{a + a \operatorname{Cos}[c + d x]} \operatorname{Sin}[c + d x]}{15 d \operatorname{Cos}[c + d x]^{3/2}} + \frac{2 a A (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sin}[c + d x]}{5 d \operatorname{Cos}[c + d x]^{5/2}}$$

Result (type 3, 800 leaves):

$$\frac{1}{120 \sqrt{2} d \operatorname{Cos}[c + d x]^{5/2} \sqrt{\operatorname{Cos}[c + d x] (\operatorname{Cos}[d x] + i \operatorname{Sin}[d x])}}$$
$$(a (1 + \operatorname{Cos}[c + d x]))^{5/2} \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^5 \left(\frac{15}{4} B e^{-\frac{5}{2} i d x} \operatorname{Cos}\left[\frac{c}{2}\right]^2\right.$$
$$\operatorname{Log}\left[2 \left(e^{i d x} \operatorname{Cos}\left[\frac{c}{2}\right] + i e^{i d x} \operatorname{Sin}\left[\frac{c}{2}\right] + \sqrt{(1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]}\right)\right]$$
$$\left(i (1 + e^{2 i d x}) \operatorname{Cos}[c] - (-1 + e^{2 i d x}) \operatorname{Sin}[c]\right)^3 + \frac{15}{4} B e^{-\frac{5}{2} i d x}$$
$$\operatorname{Log}\left[2 \left(e^{i d x} \operatorname{Cos}\left[\frac{c}{2}\right] + i e^{i d x} \operatorname{Sin}\left[\frac{c}{2}\right] + \sqrt{(1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]}\right)\right]$$
$$\operatorname{Sin}\left[\frac{c}{2}\right]^2 \left(i (1 + e^{2 i d x}) \operatorname{Cos}[c] - (-1 + e^{2 i d x}) \operatorname{Sin}[c]\right)^3 +$$
$$\frac{15}{4} i B e^{-\frac{5}{2} i d x} \operatorname{ArcTanh}\left[\left(\operatorname{Cos}\left[\frac{c}{2}\right] + i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \sqrt{(1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]}\right]$$
$$\operatorname{Cos}\left[\frac{c}{2}\right]^2 \left((1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]\right)^3 +$$
$$\frac{15}{4} i B e^{-\frac{5}{2} i d x} \operatorname{ArcTanh}\left[\left(\operatorname{Cos}\left[\frac{c}{2}\right] + i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \sqrt{(1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]}\right]$$
$$\operatorname{Sin}\left[\frac{c}{2}\right]^2 \left((1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]\right)^3 +$$
$$12 A \sqrt{(1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] +$$
$$56 A \operatorname{Cos}[c + d x] \sqrt{(1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] +$$
$$20 B \operatorname{Cos}[c + d x] \sqrt{(1 + e^{2 i d x}) \operatorname{Cos}[c] + i (-1 + e^{2 i d x}) \operatorname{Sin}[c]} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] +$$
$$172 \sqrt{2} A \operatorname{Cos}[c + d x]^2 \sqrt{\operatorname{Cos}[c + d x] (\operatorname{Cos}[d x] + i \operatorname{Sin}[d x])} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] +$$
$$\left.160 \sqrt{2} B \operatorname{Cos}[c + d x]^2 \sqrt{\operatorname{Cos}[c + d x] (\operatorname{Cos}[d x] + i \operatorname{Sin}[d x])} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)$$

Problem 191: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Cos}[c+d x]^{3/2} (A+B \text{Cos}[c+d x])}{\sqrt{a+a \text{Cos}[c+d x]}} \, dx$$

Optimal (type 3, 190 leaves, 7 steps):

$$-\frac{(4 A-7 B) \text{ArcSin}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right]}{4 \sqrt{a} d}+\frac{\sqrt{2} (A-B) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a} d}+\frac{(4 A-B) \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{4 d \sqrt{a+a \text{Cos}[c+d x]}}+\frac{B \text{Cos}[c+d x]^{3/2} \text{Sin}[c+d x]}{2 d \sqrt{a+a \text{Cos}[c+d x]}}$$

Result (type 3, 348 leaves):

$$\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right] \left(\left(\sqrt{2} e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)} \left(-4 A d x+7 B d x+i (4 A-7 B) \text{ArcSinh}\left[e^{i (c+d x)}\right]-8 i \sqrt{2} (A-B) \text{Log}\left[1+e^{i (c+d x)}\right]-4 i A \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+7 i B \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+8 i \sqrt{2} A \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]-8 i \sqrt{2} B \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \sqrt{1+e^{2 i (c+d x)}}\right)+\frac{4 \sqrt{\text{Cos}[c+d x]} (4 A-B+2 B \text{Cos}[c+d x]) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{d}\right)\right) \Big/ \left(8 \sqrt{a (1+\text{Cos}[c+d x])}\right)$$

Problem 192: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d x]} (A+B \text{Cos}[c+d x])}{\sqrt{a+a \text{Cos}[c+d x]}} \, dx$$

Optimal (type 3, 141 leaves, 6 steps):

$$\frac{(2 A-B) \text{ArcSin}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a} d}-\frac{\sqrt{2} (A-B) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a} d}+\frac{B \sqrt{\text{Cos}[c+d x]} \text{Sin}[c+d x]}{d \sqrt{a+a \text{Cos}[c+d x]}}$$

Result (type 3, 333 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(\left(\sqrt{2}\, e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(2 A d x-B d x-i (2 A-B) \text{ArcSinh}\left[e^{i (c+d x)}\right]+ 2 i \sqrt{2} (A-B) \text{Log}\left[1+e^{i (c+d x)}\right]+2 i A \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]- i B \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-2 i \sqrt{2} A \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]+ 2 i \sqrt{2} B \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right)\Big/\left(d \sqrt{1+e^{2 i (c+d x)}}\right)+ \frac{4 B \sqrt{\text{Cos}[c+d x]}\, \text{Sin}\left[\frac{1}{2}(c+d x)\right]}{d}\right)\right)\Big/\left(2 \sqrt{a (1+\text{Cos}[c+d x])}\right)$$

Problem 193: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B \text{Cos}[c+d x]}{\sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\, dx$$

Optimal (type 3, 100 leaves, 5 steps):

$$\frac{2 B \text{ArcSin}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a}\, d}+\frac{\sqrt{2} (A-B) \text{ArcTan}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a}\, d}$$

Result (type 3, 255 leaves):

$$\left(\left(1+e^{i (c+d x)}\right) \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)} \left(B d x-i B \text{ArcSinh}\left[e^{i (c+d x)}\right]-i \sqrt{2} (A-B) \text{Log}\left[1+e^{i (c+d x)}\right]+ i B \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+i \sqrt{2} A \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]- i \sqrt{2} B \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right)\Big/ \left(\sqrt{2}\, d \sqrt{1+e^{2 i (c+d x)}} \sqrt{a (1+\text{Cos}[c+d x])}\right)$$

Problem 194: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B \text{Cos}[c+d x]}{\text{Cos}[c+d x]^{3/2} \sqrt{a+a \text{Cos}[c+d x]}}\, dx$$

Optimal (type 3, 99 leaves, 4 steps):

$$-\frac{\sqrt{2} (A-B) \text{ArcTan}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right]}{\sqrt{a}\, d}+\frac{2 A \text{Sin}[c+d x]}{d \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}$$

Result (type 3, 177 leaves):

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

Problem 195: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 142 leaves, 5 steps):

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

Result (type 3, 206 leaves):

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

Problem 196: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{7/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 187 leaves, 6 steps):

$$-\frac{\sqrt{2}\,(A-B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{\sqrt{a}\,d}+\frac{2\,A\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{2\,(A-5\,B)\,\text{Sin}[c+d\,x]}{15\,d\,\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,(13\,A-5\,B)\,\text{Sin}[c+d\,x]}{15\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 235 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}15\,i\,(A-B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right.\right.$$
$$\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\right]\right)+\frac{6\,A\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}[c+d\,x]^{5/2}}-$$
$$\left.\left.\frac{2\,(A-5\,B)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,(13\,A-5\,B)\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right)\right)\Big/\left(15\,d\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\right)$$

Problem 197: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\,(A+B\,\text{Cos}[c+d\,x])}{(a+a\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 197 leaves, 7 steps):

$$\frac{(2\,A-3\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{a^{3/2}\,d}-\frac{(5\,A-9\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}+$$
$$\frac{(A-B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}-\frac{(A-3\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 362 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\right.$$
$$\left(\left(\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\,\left(4\,A\,d\,x-6\,B\,d\,x-2\,i\,(2\,A-3\,B)\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+\right.\right.\right.$$
$$i\,\sqrt{2}\,(5\,A-9\,B)\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+4\,i\,A\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\right]-$$
$$6\,i\,B\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\right]-5\,i\,\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\right]+$$
$$\left.\left.9\,i\,\sqrt{2}\,B\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\right]\right)\right)\Big/\left(d\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right)+\frac{1}{d}$$
$$\left.\left.2\,\sqrt{\text{Cos}[c+d\,x]}\,(-A+3\,B+2\,B\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(2\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\right)$$

Problem 198: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,(A+B\,\text{Cos}[c+d\,x])}{(a+a\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 145 leaves, 6 steps):

$$\frac{2\,B\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{a^{3/2}\,d}+\frac{(A-5\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}+\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}$$

Result (type 3, 313 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(\left(\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right.\right.\right.$$
$$\left(4\,B\,d\,x-4\,i\,B\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-i\,\sqrt{2}\,(A-5\,B)\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+\right.$$
$$4\,i\,B\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+i\,\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-$$
$$\left.\left.5\,i\,\sqrt{2}\,B\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(d\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right)+$$
$$\left.\left.\frac{2\,(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{d}\right)\right)\Big/\left(2\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\right)$$

Problem 199: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 107 leaves, 4 steps):

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

Result (type 3, 195 leaves):

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

Problem 200: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{3/2}\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 156 leaves, 5 steps):

$$-\frac{(7A-3B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B)\,\text{Sin}[c+dx]}{2\,d\,\sqrt{\text{Cos}[c+dx]}\,(a+a\,\text{Cos}[c+dx])^{3/2}}+\frac{(5A-B)\,\text{Sin}[c+dx]}{2\,a\,d\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 209 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(\left(i\,(7A-3B)\,e^{\frac{1}{2}i(c+dx)}\sqrt{e^{-i(c+dx)}\left(1+e^{2i(c+dx)}\right)}\left(\text{Log}\left[1+e^{i(c+dx)}\right]-\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\right)\Big/\left(d\sqrt{1+e^{2i(c+dx)}}\right)+\frac{(4A+(5A-B)\,\text{Cos}[c+dx])\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Tan}\left[\frac{1}{2}(c+dx)\right]}{d\sqrt{\text{Cos}[c+dx]}}\right)\right)\Big/\left(a\,(1+\text{Cos}[c+dx])\right)^{3/2}$$

Problem 201: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+dx]}{\text{Cos}[c+dx]^{5/2}\,(a+a\,\text{Cos}[c+dx])^{3/2}}\,dx$$

Optimal (type 3, 203 leaves, 6 steps):

$$\frac{(11A-7B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]}{2\sqrt{2}\,a^{3/2}\,d}-\frac{(A-B)\,\text{Sin}[c+dx]}{2\,d\,\text{Cos}[c+dx]^{3/2}\,(a+a\,\text{Cos}[c+dx])^{3/2}}+\frac{(7A-3B)\,\text{Sin}[c+dx]}{6\,a\,d\,\text{Cos}[c+dx]^{3/2}\sqrt{a+a\,\text{Cos}[c+dx]}}-\frac{(19A-15B)\,\text{Sin}[c+dx]}{6\,a\,d\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}$$

Result (type 3, 230 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+dx)\right]^3\left(-\left(\left(i\,(11A-7B)\,e^{\frac{1}{2}i(c+dx)}\sqrt{e^{-i(c+dx)}\left(1+e^{2i(c+dx)}\right)}\left(\text{Log}\left[1+e^{i(c+dx)}\right]-\text{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\right)\Big/\left(d\sqrt{1+e^{2i(c+dx)}}\right)\right)-\left((11A-15B+24(A-B)\,\text{Cos}[c+dx]+(19A-15B)\,\text{Cos}[2(c+dx)])\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\Big/\left(6\,d\,\text{Cos}[c+dx]^{3/2}\right)\right)\right)\Big/\left(a\,(1+\text{Cos}[c+dx])\right)^{3/2}$$

Problem 202: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Cos}[c+dx]^{5/2}\,(A+B\,\text{Cos}[c+dx])}{(a+a\,\text{Cos}[c+dx])^{5/2}}\,dx$$

Optimal (type 3, 246 leaves, 8 steps):

$$\frac{(2A-5B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{a^{5/2}\,d}-\frac{(43A-115B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}+\frac{(A-B)\,\text{Cos}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{4\,d\,(a+a\,\text{Cos}[c+d x])^{5/2}}+\frac{(7A-15B)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d x])^{3/2}}-\frac{(11A-35B)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 376 leaves):

$$\frac{1}{8\,d\,(a\,(1+\text{Cos}[c+d x]))^{5/2}}\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}}\sqrt{2}\,e^{\frac{1}{2} i (c+d x)}\sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\right.$$
$$\Big(32\,A\,d\,x-80\,B\,d\,x-16\,i\,(2A-5B)\,\text{ArcSinh}\left[e^{i (c+d x)}\right]+i\sqrt{2}\,(43A-115B)\,\text{Log}\left[1+e^{i (c+d x)}\right]+$$
$$32\,i\,A\,\text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-80\,i\,B\,\text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-43\,i\sqrt{2}\,A\,\text{Log}\Big[$$
$$1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\Big]+115\,i\sqrt{2}\,B\,\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\Big)+$$
$$\sqrt{\text{Cos}[c+d x]}\,(-11A+43B+(-15A+55B)\,\text{Cos}[c+d x]+8\,B\,\text{Cos}[2\,(c+d x)])$$
$$\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)$$

Problem 203: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Cos}[c+d x]^{3/2}\,(A+B\,\text{Cos}[c+d x])}{(a+a\,\text{Cos}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 194 leaves, 7 steps):

$$\frac{2\,B\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{a^{5/2}\,d}+\frac{(3A-43B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{16\sqrt{2}\,a^{5/2}\,d}+\frac{(A-B)\,\text{Cos}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{4\,d\,(a+a\,\text{Cos}[c+d x])^{5/2}}+\frac{(3A-11B)\,\sqrt{\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d x])^{3/2}}$$

Result (type 3, 329 leaves):

$$\frac{1}{8\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right.$$
$$\left(32\,B\,d\,x-32\,i\,B\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-i\,\sqrt{2}\,(3\,A-43\,B)\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+\right.$$
$$32\,i\,B\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+3\,i\,\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-$$
$$\left.43\,i\,\sqrt{2}\,B\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$
$$\left.\sqrt{\text{Cos}[c+d\,x]}\,\left(3\,A-11\,B+(7\,A-15\,B)\,\text{Cos}[c+d\,x]\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 204: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 154 leaves, 5 steps):

$$\frac{(5\,A+3\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}+$$
$$\frac{(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}+\frac{(A+7\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{16\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}}$$

Result (type 3, 215 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(-\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}i\,(5\,A+3\,B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\right.\right.$$
$$\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\,\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$
$$\left.\left.\frac{1}{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\left(5\,A+3\,B+(A+7\,B)\,\text{Cos}[c+d\,x]\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/$$
$$\left(4\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\right)$$

Problem 205: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 3, 156 leaves, 5 steps):

$$\frac{(19 A+5 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}-\frac{(A-B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{4 d (a+a \operatorname{Cos}[c+d x])^{5/2}}-\frac{(9 A-B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{16 a d (a+a \operatorname{Cos}[c+d x])^{3/2}}$$

Result (type 3, 217 leaves):

$$\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(-\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} i (19 A+5 B) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\operatorname{Log}\left[1+e^{i (c+d x)}\right]-\operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)-\frac{1}{2} \sqrt{\operatorname{Cos}[c+d x]}(13 A-5 B+(9 A-B) \operatorname{Cos}[c+d x]) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(4 d(a(1+\operatorname{Cos}[c+d x]))^{5/2}\right)$$

Problem 206: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B \operatorname{Cos}[c+d x]}{\operatorname{Cos}[c+d x]^{3/2}(a+a \operatorname{Cos}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 203 leaves, 6 steps):

$$-\frac{(75 A-19 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{16 \sqrt{2} a^{5/2} d}-\frac{(A-B) \operatorname{Sin}[c+d x]}{4 d \sqrt{\operatorname{Cos}[c+d x]}(a+a \operatorname{Cos}[c+d x])^{5/2}}-\frac{(13 A-5 B) \operatorname{Sin}[c+d x]}{16 a d \sqrt{\operatorname{Cos}[c+d x]}(a+a \operatorname{Cos}[c+d x])^{3/2}}+\frac{(49 A-9 B) \operatorname{Sin}[c+d x]}{16 a^2 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}$$

Result (type 3, 234 leaves):

$$\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} i (75 A-19 B) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\operatorname{Log}\left[1+e^{i (c+d x)}\right]-\operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\left((113 A-9 B+2(85 A-13 B) \operatorname{Cos}[c+d x]+(49 A-9 B) \operatorname{Cos}[2(c+d x)]) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^3 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right) \Big/ \left(4 \sqrt{\operatorname{Cos}[c+d x]}\right)\right)\right) \Big/ \left(4 d(a(1+\operatorname{Cos}[c+d x]))^{5/2}\right)$$

Problem 207: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B \operatorname{Cos}[c+d x]}{\operatorname{Cos}[c+d x]^{5/2}(a+a \operatorname{Cos}[c+d x])^{5/2}} \, dx$$

Optimal (type 3, 250 leaves, 7 steps):

$$\frac{(163\,A-75\,B)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{16\,\sqrt{2}\,a^{5/2}\,d}-\frac{(A-B)\,\mathrm{Sin}[c+d\,x]}{4\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Cos}[c+d\,x])^{5/2}}-\frac{(17\,A-9\,B)\,\mathrm{Sin}[c+d\,x]}{16\,a\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,(a+a\,\mathrm{Cos}[c+d\,x])^{3/2}}+\frac{(95\,A-39\,B)\,\mathrm{Sin}[c+d\,x]}{48\,a^2\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}-\frac{(299\,A-147\,B)\,\mathrm{Sin}[c+d\,x]}{48\,a^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 256 leaves):

$$-\left(\left(\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^5\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}3\,i\,(163\,A-75\,B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\left(\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]-\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\left(\left(878\,A-510\,B+(1537\,A-825\,B)\,\mathrm{Cos}[c+d\,x]+2\,(503\,A-255\,B)\,\mathrm{Cos}[2\,(c+d\,x)]+299\,A\,\mathrm{Cos}[3\,(c+d\,x)]-147\,B\,\mathrm{Cos}[3\,(c+d\,x)]\right)\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^3\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left(8\,\mathrm{Cos}[c+d\,x]^{3/2}\right)\right)\right)\Big/\left(12\,d\,(a\,(1+\mathrm{Cos}[c+d\,x]))^{5/2}\right)\right)$$

Problem 208: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Cos}[c+d\,x]^{7/2}\,(A+B\,\mathrm{Cos}[c+d\,x])}{(a+a\,\mathrm{Cos}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 3, 293 leaves, 9 steps):

$$\frac{(2\,A-7\,B)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{a^{7/2}\,d}-\frac{(177\,A-637\,B)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]}{64\,\sqrt{2}\,a^{7/2}\,d}+\frac{(A-B)\,\mathrm{Cos}[c+d\,x]^{7/2}\,\mathrm{Sin}[c+d\,x]}{6\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^{7/2}}+\frac{(3\,A-7\,B)\,\mathrm{Cos}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^{5/2}}+\frac{(79\,A-259\,B)\,\mathrm{Cos}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{192\,a^2\,d\,(a+a\,\mathrm{Cos}[c+d\,x])^{3/2}}-\frac{7\,(7\,A-27\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{64\,a^3\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 3, 639 leaves):

$$\frac{1}{8\sqrt{2}\, d\, \sqrt{1+e^{2 i (c+d x)}}\, \left(a\, (1+\text{Cos}[c+d x])\right)^{7/2}} e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)} \left(1+e^{2 i (c+d x)}\right)}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^7$$

$$\Big(128\, A\, d\, x-448\, B\, d\, x-64\, i\, (2\, A-7\, B)\, \text{ArcSinh}\left[e^{i (c+d x)}\right]+i \sqrt{2}\, (177\, A-637\, B)\, \text{Log}\left[1+e^{i (c+d x)}\right]+$$

$$128\, i\, A\, \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-448\, i\, B\, \text{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]-177\, i \sqrt{2}\, A$$

$$\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]+637\, i \sqrt{2}\, B\, \text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\Big)+$$

$$\Bigg(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 \sqrt{\text{Cos}[c+d x]}\, \Bigg(\frac{16\, B\, \text{Cos}\left[\frac{d x}{2}\right] \text{Sin}\left[\frac{c}{2}\right]}{d}+\frac{16\, B\, \text{Cos}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]}{d}+$$

$$\frac{\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(11\, A\, \text{Sin}\left[\frac{d x}{2}\right]-15\, B\, \text{Sin}\left[\frac{d x}{2}\right]\right)}{4\, d}+$$

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

$$\frac{\text{Sec}\left[\frac{c}{2}\right] \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(-247\, A\, \text{Sin}\left[\frac{d x}{2}\right]+523\, B\, \text{Sin}\left[\frac{d x}{2}\right]\right)}{24\, d}-$$

$$\frac{(247\, A-523\, B)\, \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \text{Tan}\left[\frac{c}{2}\right]}{24\, d}+\frac{(11\, A-15\, B)\, \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \text{Tan}\left[\frac{c}{2}\right]}{4\, d}-$$

$$\frac{(A-B)\, \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \text{Tan}\left[\frac{c}{2}\right]}{3\, d}\Bigg)\Bigg) \Big/ \left(a\, (1+\text{Cos}[c+d x])\right)^{7/2}$$

Problem 209: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Cos}[c+d x]^{5/2}\, (A+B\, \text{Cos}[c+d x])}{(a+a\, \text{Cos}[c+d x])^{7/2}}\, dx$$

Optimal (type 3, 241 leaves, 8 steps):

$$\frac{2\, B\, \text{ArcSin}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{a+a\, \text{Cos}[c+d x]}}\right]}{a^{7/2}\, d}+$$

$$\frac{(5\, A-177\, B)\, \text{ArcTan}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a\, \text{Cos}[c+d x]}}\right]}{64 \sqrt{2}\, a^{7/2}\, d}+\frac{(A-B)\, \text{Cos}[c+d x]^{5/2}\, \text{Sin}[c+d x]}{6\, d\, (a+a\, \text{Cos}[c+d x])^{7/2}}+$$

$$\frac{(5\, A-17\, B)\, \text{Cos}[c+d x]^{3/2}\, \text{Sin}[c+d x]}{48\, a\, d\, (a+a\, \text{Cos}[c+d x])^{5/2}}+\frac{(5\, A-49\, B) \sqrt{\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{64\, a^2\, d\, (a+a\, \text{Cos}[c+d x])^{3/2}}$$

Result (type 3, 350 leaves):

$$\frac{1}{48\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{7/2}}\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^7\left(\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}3\,\sqrt{2}\,e^{\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\right.$$
$$\left(128\,B\,d\,x-128\,i\,B\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-i\,\sqrt{2}\,(5\,A-177\,B)\,\text{Log}\left[1+e^{i\,(c+d\,x)}\right]+\right.$$
$$128\,i\,B\,\text{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+5\,i\,\sqrt{2}\,A\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-$$
$$\left.177\,i\,\sqrt{2}\,B\,\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$
$$\frac{1}{4}\sqrt{\text{Cos}[c+d\,x]}\,\left(97\,A-541\,B+4\,(25\,A-181\,B)\,\text{Cos}[c+d\,x]+(67\,A-247\,B)\,\text{Cos}[2\,(c+d\,x)]\right)$$
$$\left.\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 210: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\,(A+B\,\text{Cos}[c+d\,x])}{(a+a\,\text{Cos}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 3, 201 leaves, 6 steps):

$$\frac{(7\,A+5\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]}{64\,\sqrt{2}\,a^{7/2}\,d}+\frac{(A-B)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{6\,d\,(a+a\,\text{Cos}[c+d\,x])^{7/2}}+$$
$$\frac{(A-13\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{48\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}+\frac{(17\,A+67\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{192\,a^2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}$$

Result (type 3, 234 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^7\left(-\frac{1}{\sqrt{1+e^{2\,i\,(c+d\,x)}}}3\,i\,(7\,A+5\,B)\,e^{\frac{1}{2}\,i\,(c+d\,x)}\right.\right.$$
$$\sqrt{e^{-i\,(c+d\,x)}\,\left(1+e^{2\,i\,(c+d\,x)}\right)}\,\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$
$$\frac{1}{8}\sqrt{\text{Cos}[c+d\,x]}\,\left(59\,A+97\,B+20\,(7\,A+5\,B)\,\text{Cos}[c+d\,x]+(17\,A+67\,B)\,\text{Cos}[2\,(c+d\,x)]\right)$$
$$\left.\left.\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^5\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(24\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{7/2}\right)$$

Problem 211: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,(A+B\,\text{Cos}[c+d\,x])}{(a+a\,\text{Cos}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 3, 201 leaves, 6 steps):

$$\frac{(13 A+7 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{64 \sqrt{2} a^{7/2} d}+\frac{(A-B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{6 d (a+a \operatorname{Cos}[c+d x])^{7/2}}+\frac{(A+3 B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{16 a d (a+a \operatorname{Cos}[c+d x])^{5/2}}-\frac{(5 A-17 B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{192 a^2 d (a+a \operatorname{Cos}[c+d x])^{3/2}}$$

Result (type 3, 232 leaves):

$$\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^7\left(-\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} 3 i (13 A+7 B) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\operatorname{Log}\left[1+e^{i (c+d x)}\right]-\operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\frac{1}{8} \sqrt{\operatorname{Cos}[c+d x]}(73 A+59 B+4(A+35 B) \operatorname{Cos}[c+d x]+(-5 A+17 B) \operatorname{Cos}[2(c+d x)]) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(24 d (a(1+\operatorname{Cos}[c+d x]))^{7/2}\right)$$

Problem 212: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B \operatorname{Cos}[c+d x]}{\sqrt{\operatorname{Cos}[c+d x]}(a+a \operatorname{Cos}[c+d x])^{7/2}} \, dx$$

Optimal (type 3, 203 leaves, 6 steps):

$$\frac{(63 A+13 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right]}{64 \sqrt{2} a^{7/2} d}-\frac{(A-B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{6 d (a+a \operatorname{Cos}[c+d x])^{7/2}}-\frac{(5 A-B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{16 a d (a+a \operatorname{Cos}[c+d x])^{5/2}}-\frac{(103 A+5 B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{192 a^2 d (a+a \operatorname{Cos}[c+d x])^{3/2}}$$

Result (type 3, 233 leaves):

$$-\left(\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]^7\left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}} 3 i (63 A+13 B) e^{\frac{1}{2} i (c+d x)} \sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\operatorname{Log}\left[1+e^{i (c+d x)}\right]-\operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\frac{1}{8} \sqrt{\operatorname{Cos}[c+d x]}(493 A-73 B+(532 A-4 B) \operatorname{Cos}[c+d x]+(103 A+5 B) \operatorname{Cos}[2(c+d x)]) \operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^5 \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(24 d (a(1+\operatorname{Cos}[c+d x]))^{7/2}\right)\right)$$

Problem 213: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A+B \operatorname{Cos}[c+d x]}{\operatorname{Cos}[c+d x]^{3/2}(a+a \operatorname{Cos}[c+d x])^{7/2}} \, dx$$

Optimal (type 3, 250 leaves, 7 steps):

$$-\frac{3\,(121 A-21 B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{64\,\sqrt{2}\,a^{7/2}\,d}-\frac{(A-B)\,\text{Sin}[c+d x]}{6\,d\,\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Cos}[c+d x])^{7/2}}-\frac{(19 A-7 B)\,\text{Sin}[c+d x]}{48\,a\,d\,\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Cos}[c+d x])^{5/2}}-\frac{(199 A-43 B)\,\text{Sin}[c+d x]}{192\,a^2\,d\,\sqrt{\text{Cos}[c+d x]}\,(a+a\,\text{Cos}[c+d x])^{3/2}}+\frac{(691 A-103 B)\,\text{Sin}[c+d x]}{192\,a^3\,d\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 257 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^7\left(\frac{1}{\sqrt{1+e^{2 i (c+d x)}}}9\,i\,(121 A-21 B)\,e^{\frac{1}{2} i (c+d x)}\sqrt{e^{-i (c+d x)}\left(1+e^{2 i (c+d x)}\right)}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\,\sqrt{1+e^{2 i (c+d x)}}\right]\right)+\left(\left(5284 A-532 B+9\,(941 A-121 B)\,\text{Cos}[c+d x]+4\,(937 A-133 B)\,\text{Cos}[2\,(c+d x)]+691 A\,\text{Cos}[3\,(c+d x)]-103 B\,\text{Cos}[3\,(c+d x)]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^5\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big/\left(16\,\sqrt{\text{Cos}[c+d x]}\right)\right)\right)\Big/\left(24\,d\,\left(a\,(1+\text{Cos}[c+d x])\right)^{7/2}\right)$$

Problem 214: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{5/2}\,(a+a\,\text{Cos}[c+d x])^{7/2}}\,dx$$

Optimal (type 3, 297 leaves, 8 steps):

$$\frac{(1015 A-363 B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}\right]}{64\,\sqrt{2}\,a^{7/2}\,d}-\frac{(A-B)\,\text{Sin}[c+d x]}{6\,d\,\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Cos}[c+d x])^{7/2}}-\frac{(23 A-11 B)\,\text{Sin}[c+d x]}{48\,a\,d\,\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Cos}[c+d x])^{5/2}}-\frac{(109 A-41 B)\,\text{Sin}[c+d x]}{64\,a^2\,d\,\text{Cos}[c+d x]^{3/2}\,(a+a\,\text{Cos}[c+d x])^{3/2}}+\frac{(579 A-199 B)\,\text{Sin}[c+d x]}{192\,a^3\,d\,\text{Cos}[c+d x]^{3/2}\,\sqrt{a+a\,\text{Cos}[c+d x]}}-\frac{(1887 A-691 B)\,\text{Sin}[c+d x]}{192\,a^3\,d\,\sqrt{\text{Cos}[c+d x]}\,\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 524 leaves):

$$-\left(\left(i\,(1015\,A-363\,B)\,e^{\frac{1}{2}i\,(c+d\,x)}\sqrt{e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)}\right.\right.$$
$$\left.\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\left(\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]-\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/$$
$$\left.\left(8\,d\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\left(a\,(1+\mathrm{Cos}[c+d\,x])\right)^{7/2}\right)\right)+$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\sqrt{\mathrm{Cos}[c+d\,x]}\left(\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(-A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+\right.\right.$$
$$\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(-13\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+9\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{4\,d}+$$
$$\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(-607\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+307\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{24\,d}+\frac{32\,A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]}{3\,d}-$$
$$\frac{32\,\mathrm{Sec}[c+d\,x]\left(10\,A\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]-3\,B\,\mathrm{Sin}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\right)}{3\,d}-\frac{(607\,A-307\,B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\mathrm{Tan}\left[\frac{c}{2}\right]}{24\,d}-$$
$$\left.\left.\frac{(13\,A-9\,B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\mathrm{Tan}\left[\frac{c}{2}\right]}{4\,d}-\frac{(A-B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a\,(1+\mathrm{Cos}[c+d\,x])\right)^{7/2}$$

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

$$\int (a+b\,\mathrm{Cos}[c+d\,x])\,(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]\,dx$$

Optimal (type 3, 35 leaves, 4 steps):

$$(A\,b+a\,B)\,x+\frac{a\,A\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{d}+\frac{b\,B\,\mathrm{Sin}[c+d\,x]}{d}$$

Result (type 3, 104 leaves):

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

Problem 219: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 35 leaves, 4 steps):

$$b\,B\,x+\frac{(A\,b+a\,B)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{d}+\frac{a\,A\,\mathrm{Tan}[c+d\,x]}{d}$$

Result (type 3, 159 leaves):

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

Problem 220: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 61 leaves, 6 steps):

$$\frac{(a A+2 b B) \text{ArcTanh}[\text{Sin}[c+d x]]}{2 d} + \frac{(A b+a B) \text{Tan}[c+d x]}{d} + \frac{a A \text{Sec}[c+d x] \text{Tan}[c+d x]}{2 d}$$

Result (type 3, 164 leaves):

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

Problem 222: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 114 leaves, 7 steps):

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

Result (type 3, 403 leaves):

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

Problem 228: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 80 leaves, 4 steps):

$$b^2\,B\,x+\frac{\left(a^2\,A+2\,A\,b^2+4\,a\,b\,B\right)\,\mathrm{ArcTanh}[\mathrm{Sin}[c+d\,x]]}{2\,d}+$$
$$\frac{a\,(2\,A\,b+a\,B)\,\mathrm{Tan}[c+d\,x]}{d}+\frac{a^2\,A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,d}$$

Result (type 3, 225 leaves):

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

Problem 230: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 156 leaves, 7 steps):

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

Result (type 3, 457 leaves):

$$\frac{1}{48 d}\left(-6 \left(3 a^2 A+4 A b^2+8 a b B\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+6 \left(3 a^2 A+4 A b^2+8 a b B\right) \text{Log}\left[\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right]+\frac{3 a^2 A}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+\frac{12 A b^2+8 a b (A+3 B)+a^2 (9 A+4 B)}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{8 a (2 A b+a B) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}+\frac{16 \left(4 a A b+2 a^2 B+3 b^2 B\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]-\text{Sin}\left[\frac{1}{2} (c+d x)\right]}-\frac{3 a^2 A}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^4}+\frac{8 a (2 A b+a B) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^3}-\frac{12 A b^2+8 a b (A+3 B)+a^2 (9 A+4 B)}{\left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]\right)^2}+\frac{16 \left(4 a A b+2 a^2 B+3 b^2 B\right) \text{Sin}\left[\frac{1}{2} (c+d x)\right]}{\text{Cos}\left[\frac{1}{2} (c+d x)\right]+\text{Sin}\left[\frac{1}{2} (c+d x)\right]}\right)$$

Problem 236: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 124 leaves, 5 steps):

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

Result (type 3, 277 leaves):

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

Problem 237: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 145 leaves, 5 steps):

$$b^3\,B\,x+\frac{\left(3\,a^2\,A\,b+2\,A\,b^3+a^3\,B+6\,a\,b^2\,B\right)\,\text{ArcTanh}\left[\text{Sin}\left[c+d\,x\right]\right]}{2\,d}+$$
$$\frac{a\,\left(2\,a^2\,A+8\,A\,b^2+9\,a\,b\,B\right)\,\text{Tan}\left[c+d\,x\right]}{3\,d}+\frac{a^2\,\left(5\,A\,b+3\,a\,B\right)\,\text{Sec}\left[c+d\,x\right]\,\text{Tan}\left[c+d\,x\right]}{6\,d}+$$
$$\frac{a\,A\,\left(a+b\,\text{Cos}\left[c+d\,x\right]\right)^2\,\text{Sec}\left[c+d\,x\right]^2\,\text{Tan}\left[c+d\,x\right]}{3\,d}$$

Result (type 3, 392 leaves):

$$\frac{1}{12\,d}\left(12\,b^3\,B\,\left(c+d\,x\right)-6\,\left(3\,a^2\,A\,b+2\,A\,b^3+a^3\,B+6\,a\,b^2\,B\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+\right.$$
$$6\,\left(3\,a^2\,A\,b+2\,A\,b^3+a^3\,B+6\,a\,b^2\,B\right)\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right]+$$
$$\frac{a^2\,\left(9\,A\,b+a\,\left(A+3\,B\right)\right)}{\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^2}+\frac{2\,a^3\,A\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^3}+$$
$$\frac{4\,a\,\left(2\,a^2\,A+9\,A\,b^2+9\,a\,b\,B\right)\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}+\frac{2\,a^3\,A\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^3}-$$
$$\left.\frac{a^2\,\left(9\,A\,b+a\,\left(A+3\,B\right)\right)}{\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)^2}+\frac{4\,a\,\left(2\,a^2\,A+9\,A\,b^2+9\,a\,b\,B\right)\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}\right)$$

Problem 238: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 188 leaves, 7 steps):

$$\frac{\left(3 a^3 A+12 a A b^2+12 a^2 b B+8 b^3 B\right) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{8 d}+\frac{\left(6 a^2 A b+3 A b^3+2 a^3 B+9 a b^2 B\right) \operatorname{Tan}[c+d x]}{3 d}+\frac{a\left(3 a^2 A+10 A b^2+12 a b B\right) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{8 d}+\frac{a^2(3 A b+2 a B) \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{6 d}+\frac{a A(a+b \operatorname{Cos}[c+d x])^2 \operatorname{Sec}[c+d x]^3 \operatorname{Tan}[c+d x]}{4 d}$$

Result (type 3, 639 leaves):

$$\frac{1}{8 d}\left(-3 a^3 A-12 a A b^2-12 a^2 b B-8 b^3 B\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]+\frac{1}{8 d}\left(3 a^3 A+12 a A b^2+12 a^2 b B+8 b^3 B\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]+\frac{a^3 A}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{9 a^3 A+12 a^2 A b+36 a A b^2+4 a^3 B+36 a^2 b B}{48 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}-\frac{a^3 A}{16 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^4}+\frac{-9 a^3 A-12 a^2 A b-36 a A b^2-4 a^3 B-36 a^2 b B}{48 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{3 a^2 A b \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+a^3 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{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}+\frac{3 a^2 A b \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+a^3 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{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}+\left(6 a^2 A b \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 A b^3 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+2 a^3 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+9 a b^2 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right) \Big/\left(3 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+\left(6 a^2 A b \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+3 A b^3 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+2 a^3 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+9 a b^2 B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right) \Big/\left(3 d\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)$$

Problem 246: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 198 leaves, 6 steps):

$$b^3 (A b + 4 a B) x + \frac{a (4 a^2 A b + 8 A b^3 + a^3 B + 12 a b^2 B) \text{ArcTanh}[\text{Sin}[c + d x]]}{2 d} - \frac{b^2 (8 a A b + 3 a^2 B - 6 b^2 B) \text{Sin}[c + d x]}{6 d} + \frac{a^2 (2 a^2 A + 9 A b^2 + 9 a b B) \text{Tan}[c + d x]}{3 d} + \frac{a (2 A b + a B) (a + b \text{Cos}[c + d x])^2 \text{Sec}[c + d x] \text{Tan}[c + d x]}{2 d} + \frac{a A (a + b \text{Cos}[c + d x])^3 \text{Sec}[c + d x]^2 \text{Tan}[c + d x]}{3 d}$$

Result (type 3, 831 leaves) :

$$\frac{b^3 (A b+4 a B) (c+d x) \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4}{d (a+b \operatorname{Cos}[c+d x])^4}+$$
$$\left(\left(-4 a^3 A b-8 a A b^3-a^4 B-12 a^2 b^2 B\right) \operatorname{Cos}[c+d x]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right](b+a \operatorname{Sec}[c+d x])^4\right) \Big/ \left(2 d (a+b \operatorname{Cos}[c+d x])^4\right)+$$
$$\left(\left(4 a^3 A b+8 a A b^3+a^4 B+12 a^2 b^2 B\right) \operatorname{Cos}[c+d x]^4 \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right](b+a \operatorname{Sec}[c+d x])^4\right) \Big/ \left(2 d (a+b \operatorname{Cos}[c+d x])^4\right)+$$
$$\frac{\left(a^4 A+12 a^3 A b+3 a^4 B\right) \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4}{12 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\frac{a^4 A \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\frac{a^4 A \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{6 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^3}+$$
$$\frac{\left(-a^4 A-12 a^3 A b-3 a^4 B\right) \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4}{12 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+$$
$$\left(2 \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \left(a^4 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+9 a^2 A b^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+6 a^3 b B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(3 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\left(2 \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \left(a^4 A \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+9 a^2 A b^2 \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]+6 a^3 b B \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right) \Big/ \left(3 d (a+b \operatorname{Cos}[c+d x])^4 \left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)+$$
$$\frac{b^4 B \operatorname{Cos}[c+d x]^4 (b+a \operatorname{Sec}[c+d x])^4 \operatorname{Sin}[c+d x]}{d (a+b \operatorname{Cos}[c+d x])^4}$$

Problem 256: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 143 leaves, 6 steps):

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

Result (type 3, 300 leaves):

$$\frac{1}{4 a^3 d}\left(\frac{8 b^2 (A b-a B) \operatorname{ArcTanh}\left[\frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]}{\sqrt{-a^2+b^2}}-\right.$$
$$2\left(a^2 A+2 A b^2-2 a b B\right) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$2\left(a^2 A+2 A b^2-2 a b B\right) \operatorname{Log}\left[\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right]+$$
$$\frac{a^2 A}{\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{4 a (-A b+a B) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]-\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}-$$
$$\left.\frac{a^2 A}{\left(\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]\right)^2}+\frac{4 a (-A b+a B) \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]+\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}\right)$$

Problem 257: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 187 leaves, 7 steps):

$$\frac{2 b^3 (A b-a B) \operatorname{ArcTan}\left[\frac{\sqrt{a-b} \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]}{a^4 \sqrt{a-b} \sqrt{a+b} d}-\frac{\left(a^2+2 b^2\right)(A b-a B) \operatorname{ArcTanh}[\operatorname{Sin}[c+d x]]}{2 a^4 d}+\frac{\left(2 a^2 A+3 A b^2-3 a b B\right) \operatorname{Tan}[c+d x]}{3 a^3 d}-\frac{(A b-a B) \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{2 a^2 d}+\frac{A \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 a d}$$

Result (type 3, 422 leaves):

$$\frac{1}{12 a^4 d}\left(\frac{24 b^3 (-A b + a B) \operatorname{ArcTanh}\left[\frac{(a-b) \operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]}{\sqrt{-a^2+b^2}} - \right.$$

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

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

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

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

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

Problem 273: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 409 leaves, 7 steps):

$$\frac{(A b - 4 a B) x}{b^5} - \left(a \left(2 a^6 A b - 7 a^4 A b^3 + 8 a^2 A b^5 - 8 A b^7 - 8 a^7 B + 28 a^5 b^2 B - 35 a^3 b^4 B + 20 a b^6 B\right)\right.$$

$$\left.\operatorname{ArcTan}\left[\frac{\sqrt{a-b}\,\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a+b}}\right]\right) \Big/ \left((a-b)^{7/2} b^5 (a+b)^{7/2} d\right) -$$

$$\frac{(3 a^3 A b - 8 a A b^3 - 12 a^4 B + 23 a^2 b^2 B - 6 b^4 B) \operatorname{Sin}[c+d x]}{6 b^4 (a^2-b^2)^2 d} +$$

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

$$\frac{a (a^2 A b - 6 A b^3 - 4 a^3 B + 9 a b^2 B) \operatorname{Cos}[c+d x]^2 \operatorname{Sin}[c+d x]}{6 b^2 (a^2-b^2)^2 d (a + b \operatorname{Cos}[c+d x])^2} -$$

$$\left(a^2 (a^4 A b - 2 a^2 A b^3 + 6 A b^5 - 4 a^5 B + 11 a^3 b^2 B - 12 a b^4 B) \operatorname{Sin}[c+d x]\right) \Big/ \left(2 b^4 (a^2-b^2)^3 d (a + b \operatorname{Cos}[c+d x])\right)$$

Result (type 3, 1278 leaves):

$$-\left(\left(a\left(-2 a^6 A b+7 a^4 A b^3-8 a^2 A b^5+8 A b^7+8 a^7 B-28 a^5 b^2 B+35 a^3 b^4 B-20 a b^6 B\right)\right.\right.$$
$$\left.\left.\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2+b^2}}\right]\right)\Big/\left(b^5\left(a^2-b^2\right)^3\sqrt{-a^2+b^2}\;d\right)\right)+$$
$$\frac{1}{24 b^5\left(-a^2+b^2\right)^3 d\,(a+b\,\text{Cos}[c+d x])^3}\left(-24 a^9 A b\,(c+d x)+36 a^7 A b^3\,(c+d x)+\right.$$
$$36 a^5 A b^5\,(c+d x)-84 a^3 A b^7\,(c+d x)+36 a A b^9\,(c+d x)+96 a^{10} B\,(c+d x)-$$
$$144 a^8 b^2 B\,(c+d x)-144 a^6 b^4 B\,(c+d x)+336 a^4 b^6 B\,(c+d x)-144 a^2 b^8 B\,(c+d x)-$$
$$72 a^8 A b^2\,(c+d x)\,\text{Cos}[c+d x]+198 a^6 A b^4\,(c+d x)\,\text{Cos}[c+d x]-$$
$$162 a^4 A b^6\,(c+d x)\,\text{Cos}[c+d x]+18 a^2 A b^8\,(c+d x)\,\text{Cos}[c+d x]+$$
$$18 A b^{10}\,(c+d x)\,\text{Cos}[c+d x]+288 a^9 b B\,(c+d x)\,\text{Cos}[c+d x]-$$
$$792 a^7 b^3 B\,(c+d x)\,\text{Cos}[c+d x]+648 a^5 b^5 B\,(c+d x)\,\text{Cos}[c+d x]-$$
$$72 a^3 b^7 B\,(c+d x)\,\text{Cos}[c+d x]-72 a b^9 B\,(c+d x)\,\text{Cos}[c+d x]-$$
$$36 a^7 A b^3\,(c+d x)\,\text{Cos}[2(c+d x)]+108 a^5 A b^5\,(c+d x)\,\text{Cos}[2(c+d x)]-$$
$$108 a^3 A b^7\,(c+d x)\,\text{Cos}[2(c+d x)]+36 a A b^9\,(c+d x)\,\text{Cos}[2(c+d x)]+$$
$$144 a^8 b^2 B\,(c+d x)\,\text{Cos}[2(c+d x)]-432 a^6 b^4 B\,(c+d x)\,\text{Cos}[2(c+d x)]+$$
$$432 a^4 b^6 B\,(c+d x)\,\text{Cos}[2(c+d x)]-144 a^2 b^8 B\,(c+d x)\,\text{Cos}[2(c+d x)]-$$
$$6 a^6 A b^4\,(c+d x)\,\text{Cos}[3(c+d x)]+18 a^4 A b^6\,(c+d x)\,\text{Cos}[3(c+d x)]-$$
$$18 a^2 A b^8\,(c+d x)\,\text{Cos}[3(c+d x)]+6 A b^{10}\,(c+d x)\,\text{Cos}[3(c+d x)]+$$
$$24 a^7 b^3 B\,(c+d x)\,\text{Cos}[3(c+d x)]-72 a^5 b^5 B\,(c+d x)\,\text{Cos}[3(c+d x)]+$$
$$72 a^3 b^7 B\,(c+d x)\,\text{Cos}[3(c+d x)]-24 a b^9 B\,(c+d x)\,\text{Cos}[3(c+d x)]+$$
$$24 a^8 A b^2\,\text{Sin}[c+d x]-57 a^6 A b^4\,\text{Sin}[c+d x]+72 a^4 A b^6\,\text{Sin}[c+d x]+36 a^2 A b^8\,\text{Sin}[c+d x]-$$
$$96 a^9 b B\,\text{Sin}[c+d x]+228 a^7 b^3 B\,\text{Sin}[c+d x]-135 a^5 b^5 B\,\text{Sin}[c+d x]-$$
$$90 a^3 b^7 B\,\text{Sin}[c+d x]+18 a b^9 B\,\text{Sin}[c+d x]+30 a^7 A b^3\,\text{Sin}[2(c+d x)]-$$
$$90 a^5 A b^5\,\text{Sin}[2(c+d x)]+120 a^3 A b^7\,\text{Sin}[2(c+d x)]-120 a^8 b^2 B\,\text{Sin}[2(c+d x)]+$$
$$336 a^6 b^4 B\,\text{Sin}[2(c+d x)]-300 a^4 b^6 B\,\text{Sin}[2(c+d x)]+18 a^2 b^8 B\,\text{Sin}[2(c+d x)]+$$
$$6 b^{10} B\,\text{Sin}[2(c+d x)]+11 a^6 A b^4\,\text{Sin}[3(c+d x)]-32 a^4 A b^6\,\text{Sin}[3(c+d x)]+$$
$$36 a^2 A b^8\,\text{Sin}[3(c+d x)]-44 a^7 b^3 B\,\text{Sin}[3(c+d x)]+125 a^5 b^5 B\,\text{Sin}[3(c+d x)]-$$
$$114 a^3 b^7 B\,\text{Sin}[3(c+d x)]+18 a b^9 B\,\text{Sin}[3(c+d x)]-3 a^6 b^4 B\,\text{Sin}[4(c+d x)]+$$
$$\left.9 a^4 b^6 B\,\text{Sin}[4(c+d x)]-9 a^2 b^8 B\,\text{Sin}[4(c+d x)]+3 b^{10} B\,\text{Sin}[4(c+d x)]\right)$$

Problem 274: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 301 leaves, 6 steps):

$$\frac{B\,x}{b^4}-\left(\left(3\,a^2\,A\,b^5+2\,A\,b^7+2\,a^7\,B-7\,a^5\,b^2\,B+8\,a^3\,b^4\,B-8\,a\,b^6\,B\right)\text{ArcTan}\left[\frac{\sqrt{a-b}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a+b}}\right]\right)\Big/$$
$$\left((a-b)^{7/2}\,b^4\,(a+b)^{7/2}\,d\right)+\frac{a\,(A\,b-a\,B)\,\text{Cos}[c+d\,x]^2\,\text{Sin}[c+d\,x]}{3\,b\,(a^2-b^2)\,d\,(a+b\,\text{Cos}[c+d\,x])^3}+$$
$$\frac{a^2\,(5\,A\,b^3+3\,a^3\,B-8\,a\,b^2\,B)\,\text{Sin}[c+d\,x]}{6\,b^3\,(a^2-b^2)^2\,d\,(a+b\,\text{Cos}[c+d\,x])^2}-$$
$$\frac{a\,(a^2\,A\,b^3-16\,A\,b^5+9\,a^5\,B-28\,a^3\,b^2\,B+34\,a\,b^4\,B)\,\text{Sin}[c+d\,x]}{6\,b^3\,(a^2-b^2)^3\,d\,(a+b\,\text{Cos}[c+d\,x])}$$

Result (type 3, 717 leaves):

$$\frac{1}{24\,b^4\,d}\left(-\frac{1}{(-a^2+b^2)^{7/2}}24\,(3\,a^2\,A\,b^5+2\,A\,b^7+2\,a^7\,B-7\,a^5\,b^2\,B+8\,a^3\,b^4\,B-8\,a\,b^6\,B)\right.$$
$$\text{ArcTanh}\left[\frac{(a-b)\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{-a^2+b^2}}\right]+\frac{1}{(a^2-b^2)^3\,(a+b\,\text{Cos}[c+d\,x])^3}$$
$$\left(24\,a^9\,B\,c-36\,a^7\,b^2\,B\,c-36\,a^5\,b^4\,B\,c+84\,a^3\,b^6\,B\,c-36\,a\,b^8\,B\,c+24\,a^9\,B\,d\,x-36\,a^7\,b^2\,B\,d\,x-\right.$$
$$36\,a^5\,b^4\,B\,d\,x+84\,a^3\,b^6\,B\,d\,x-36\,a\,b^8\,B\,d\,x+18\,b\,(a^2-b^2)^3\,(4\,a^2+b^2)\,B\,(c+d\,x)\,\text{Cos}[c+d\,x]+$$
$$36\,a\,b^2\,(a^2-b^2)^3\,B\,(c+d\,x)\,\text{Cos}[2\,(c+d\,x)]+6\,a^6\,b^3\,B\,c\,\text{Cos}[3\,(c+d\,x)]-$$
$$18\,a^4\,b^5\,B\,c\,\text{Cos}[3\,(c+d\,x)]+18\,a^2\,b^7\,B\,c\,\text{Cos}[3\,(c+d\,x)]-6\,b^9\,B\,c\,\text{Cos}[3\,(c+d\,x)]+$$
$$6\,a^6\,b^3\,B\,d\,x\,\text{Cos}[3\,(c+d\,x)]-18\,a^4\,b^5\,B\,d\,x\,\text{Cos}[3\,(c+d\,x)]+18\,a^2\,b^7\,B\,d\,x\,\text{Cos}[3\,(c+d\,x)]-$$
$$6\,b^9\,B\,d\,x\,\text{Cos}[3\,(c+d\,x)]+18\,a^5\,A\,b^4\,\text{Sin}[c+d\,x]+39\,a^3\,A\,b^6\,\text{Sin}[c+d\,x]+$$
$$18\,a\,A\,b^8\,\text{Sin}[c+d\,x]-24\,a^8\,b\,B\,\text{Sin}[c+d\,x]+57\,a^6\,b^3\,B\,\text{Sin}[c+d\,x]-72\,a^4\,b^5\,B\,\text{Sin}[c+d\,x]-$$
$$36\,a^2\,b^7\,B\,\text{Sin}[c+d\,x]+6\,a^4\,A\,b^5\,\text{Sin}[2\,(c+d\,x)]+54\,a^2\,A\,b^7\,\text{Sin}[2\,(c+d\,x)]-$$
$$30\,a^7\,b^2\,B\,\text{Sin}[2\,(c+d\,x)]+90\,a^5\,b^4\,B\,\text{Sin}[2\,(c+d\,x)]-120\,a^3\,b^6\,B\,\text{Sin}[2\,(c+d\,x)]+$$
$$2\,a^5\,A\,b^4\,\text{Sin}[3\,(c+d\,x)]-5\,a^3\,A\,b^6\,\text{Sin}[3\,(c+d\,x)]+18\,a\,A\,b^8\,\text{Sin}[3\,(c+d\,x)]-$$
$$\left.\left.11\,a^6\,b^3\,B\,\text{Sin}[3\,(c+d\,x)]+32\,a^4\,b^5\,B\,\text{Sin}[3\,(c+d\,x)]-36\,a^2\,b^7\,B\,\text{Sin}[3\,(c+d\,x)]\right)\right)$$

Problem 283: Result more than twice size of optimal antiderivative.

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

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

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

Result (type 3, 23 leaves):

$$B\left(\frac{\text{Cos}[d\,x]\,\text{Sin}[c]}{d}+\frac{\text{Cos}[c]\,\text{Sin}[d\,x]}{d}\right)$$

Problem 285: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 12 leaves, 2 steps):

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

Result (type 3, 70 leaves):

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

Problem 301: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{a + b \operatorname{Cos}[c + d x]} \, (A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^2 \, dx$$

Optimal (type 4, 213 leaves, 9 steps):

$$-\frac{A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}} + \frac{(a A + 2 b B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{(A b + 2 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]}{d}$$

Result (type 4, 484 leaves):

$$\frac{1}{4d}\left(\frac{8\,b\,B\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\ \mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\ \frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\frac{2\,(A\,b+4\,a\,B)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\ \mathrm{EllipticPi}\left[2,\ \frac{1}{2}\,(c+d\,x),\ \frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+$$

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

$$\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\ \frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\ \frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\ \mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\ \frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$

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

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

$$\frac{A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\ \mathrm{Tan}[c+d\,x]}{d}$$

Problem 302: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\ (A+B\,\mathrm{Cos}[c+d\,x])\ \mathrm{Sec}[c+d\,x]^3\,dx$$

Optimal (type 4, 292 leaves, 10 steps):

$$-\frac{(A b+4 a B)\sqrt{a+b \operatorname{Cos}[c+d x]}\ \operatorname{EllipticE}\left[\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]}{4 a d\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}}+$$

$$\frac{(3 A b+4 a B)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]}{4 d\sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\frac{\left(4 a^2 A-A b^2+4 a b B\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\ \operatorname{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]}{4 a d\sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\frac{(A b+4 a B)\sqrt{a+b \operatorname{Cos}[c+d x]}\ \operatorname{Tan}[c+d x]}{4 a d}+\frac{A\sqrt{a+b \operatorname{Cos}[c+d x]}\ \operatorname{Sec}[c+d x]\operatorname{Tan}[c+d x]}{2 d}$$

Result (type 4, 552 leaves) :

$$\frac{1}{16\,a\,d}\left(\frac{8\,a\,A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(8\,a^2\,A-3\,A\,b^2+4\,a\,b\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,\left(-A\,b^2-4\,a\,b\,B\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

$$\text{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\left(2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\Bigg)\Big/$$

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

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

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{\text{Sec}[c+d\,x]\,\left(A\,b\,\text{Sin}[c+d\,x]+4\,a\,B\,\text{Sin}[c+d\,x]\right)}{4\,a}+\right.$$

$$\left.\frac{1}{2}\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)$$

Problem 303: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 378 leaves, 11 steps):

$$-\left(\left(\left(16 a^2 A-3 A b^2+6 a b B\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(24 a^2 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+$$

$$\frac{\left(16 a^2 A-A b^2+18 a b B\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{24 a d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\left(\left(4 a^2 A b+A b^3+8 a^3 B-2 a b^2 B\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/$$

$$\left(8 a^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{\left(16 a^2 A-3 A b^2+6 a b B\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Tan}[c+d x]}{24 a^2 d}+$$

$$\frac{(A b+6 a B) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{12 a d}+$$

$$\frac{A \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^2 \operatorname{Tan}[c+d x]}{3 d}$$

Result (type 4, 635 leaves) :

$$\frac{1}{96\,a^2\,d}\left(\frac{2\left(4\,a\,A\,b^2+24\,a^2\,b\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\left(8\,a^2\,A\,b+9\,A\,b^3+48\,a^3\,B-18\,a\,b^2\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right.$$

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

$$\left(2\,\text{i}\left(-16\,a^2\,A\,b+3\,A\,b^3-6\,a\,b^2\,B\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

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

$$b\left(2\,a\,\text{EllipticF}\left[\text{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

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

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

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

$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{\text{Sec}[c+d\,x]^2\left(A\,b\,\text{Sin}[c+d\,x]+6\,a\,B\,\text{Sin}[c+d\,x]\right)}{12\,a}+\frac{1}{24\,a^2}\right.$$

$$\text{Sec}[c+d\,x]\left(16\,a^2\,A\,\text{Sin}[c+d\,x]-3\,A\,b^2\,\text{Sin}[c+d\,x]+6\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+$$

$$\left.\frac{1}{3}\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)$$

Problem 307: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]\,dx$$

Optimal (type 4, 236 leaves, 9 steps):

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

Result (type 4, 406 leaves):

$$\frac{1}{6\,d}\left(\frac{4\,(6\,a\,A\,b+3\,a^2\,B+b^2\,B)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\left(2\,(6\,a^2\,A+3\,A\,b^2+4\,a\,b\,B)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\,\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{1}{a\,b\,\sqrt{-\frac{1}{a+b}}}2\,\mathrm{i}\,(3\,A\,b+4\,a\,B)\,\sqrt{-\frac{b\,(-1+\mathrm{Cos}[c+d\,x])}{a+b}}\,\sqrt{\frac{b\,(1+\mathrm{Cos}[c+d\,x])}{-a+b}}\,\,\mathrm{Csc}[c+d\,x]\left(-2\,a\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\left(-2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)+4\,b\,B\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\,\mathrm{Sin}[c+d\,x]\right)$$

Problem 308: Result unnecessarily involves imaginary or complex numbers.

$$\int (a + b \operatorname{Cos}[c + d x])^{3/2} (A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^2 \, dx$$

Optimal (type 4, 232 leaves, 9 steps):

$$-\frac{(a A - 2 b B) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}} + \frac{\left(a^2 A + 2 A b^2 + 2 a b B\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{a (3 A b + 2 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{a A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]}{d}$$

Result (type 4, 398 leaves):

$$\frac{1}{4\,d}\left(\frac{8\,b\,\left(A\,b+2\,a\,B\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(5\,a\,A\,b+4\,a^2\,B+2\,b^2\,B\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

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

$$2\,\mathrm{i}\,\left(-a\,A+2\,b\,B\right)\,\sqrt{-\frac{b\,\left(-1+\text{Cos}[c+d\,x]\right)}{a+b}}\;\sqrt{\frac{b\,\left(1+\text{Cos}[c+d\,x]\right)}{-a+b}}\;\text{Csc}[c+d\,x]$$

$$\left(-2\,a\,\left(a-b\right)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(-2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]+\right.$$

$$\left.\left.b\,\text{EllipticPi}\left[\frac{a+b}{a},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\right],\,\frac{a+b}{a-b}\right]\right)\right)+$$

$$\left.4\,a\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]\right)$$

Problem 309: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 4, 295 leaves, 10 steps):

$$-\frac{(5\,A\,b+4\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{4\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}}+$$

$$\frac{\left(7\,a\,A\,b+4\,a^2\,B+8\,b^2\,B\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\left(\left(4\,a^2\,A+3\,A\,b^2+12\,a\,b\,B\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{(5\,A\,b+4\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]}{4\,d}+$$

$$\frac{a\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]\;\text{Tan}[c+d\,x]}{2\,d}$$

Result (type 4, 556 leaves) :

$$\frac{1}{16\,d}\left(\frac{2\,\left(4\,a\,A\,b+16\,b^2\,B\right)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(8\,a^2\,A+A\,b^2+20\,a\,b\,B\right)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\frac{1}{2}\,\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,\mathrm{i}\,\left(-5\,A\,b^2-4\,a\,b\,B\right)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\right.$$

$$\mathrm{Cos}\left[2\,\left(c+d\,x\right)\right]\,\left(2\,a\,\left(a-b\right)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\right],\frac{a+b}{a-b}\right]+\right.$$

$$b\,\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\right],\frac{a+b}{a-b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Big/$$

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

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

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(\frac{1}{4}\,\mathrm{Sec}[c+d\,x]\,\left(5\,A\,b\,\mathrm{Sin}[c+d\,x]+4\,a\,B\,\mathrm{Sin}[c+d\,x]\right)+\right.$$

$$\left.\frac{1}{2}\,a\,A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]\right)$$

Problem 310: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 375 leaves, 11 steps):

$$-\left(\left(\left(16\,a^2\,A+3\,A\,b^2+30\,a\,b\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(24\,a\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(\left(16\,a^2\,A+17\,A\,b^2+42\,a\,b\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(24\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+$$

$$\left(\left(12\,a^2\,A\,b-A\,b^3+8\,a^3\,B+6\,a\,b^2\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(8\,a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\left(16\,a^2\,A+3\,A\,b^2+30\,a\,b\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Tan}[c+d\,x]}{24\,a\,d}+$$

$$\frac{(7\,A\,b+6\,a\,B)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{12\,d}+$$

$$\frac{a\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{3\,d}$$

Result (type 4, 634 leaves) :

$$\frac{1}{96\,a\,d}\left(\frac{2\left(28\,a\,A\,b^2+24\,a^2\,b\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\left(56\,a^2\,A\,b-9\,A\,b^3+48\,a^3\,B+6\,a\,b^2\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right.$$

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

$$\left(2\,\mathrm{i}\left(-16\,a^2\,A\,b-3\,A\,b^3-30\,a\,b^2\,B\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

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

$$b\left(2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

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

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

$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{12}\,\text{Sec}[c+d\,x]^2\left(7\,A\,b\,\text{Sin}[c+d\,x]+6\,a\,B\,\text{Sin}[c+d\,x]\right)+\frac{1}{24\,a}\right.$$

$$\text{Sec}[c+d\,x]\left(16\,a^2\,A\,\text{Sin}[c+d\,x]+3\,A\,b^2\,\text{Sin}[c+d\,x]+30\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+$$

$$\left.\frac{1}{3}\,a\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\right)$$

Problem 314: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]\,dx$$

Optimal (type 4, 292 leaves, 10 steps):

$$\left(2\left(35\,a\,A\,b+23\,a^2\,B+9\,b^2\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/$$
$$\left(15\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)+$$
$$\left(2\left(10\,a^2\,A\,b+5\,A\,b^3-8\,a^3\,B+8\,a\,b^2\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/$$
$$\left(15\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{2\,a^3\,A\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$
$$\frac{2\,b\left(5\,A\,b+8\,a\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{15\,d}+\frac{2\,b\,B\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 4, 453 leaves) :

$$\frac{1}{30\,d}\left(\left(4\left(45\,a^2\,A\,b+5\,A\,b^3+15\,a^3\,B+17\,a\,b^2\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\left(2\left(30\,a^3\,A+35\,a\,A\,b^2+23\,a^2\,b\,B+9\,b^3\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{1}{a\,b\,\sqrt{-\frac{1}{a+b}}}\,2\,i\left(35\,a\,A\,b+23\,a^2\,B+9\,b^2\,B\right)\sqrt{-\frac{b\,(-1+\mathrm{Cos}[c+d\,x])}{a+b}}\,\sqrt{-\frac{b\,(1+\mathrm{Cos}[c+d\,x])}{a-b}}\;\mathrm{Csc}[c+d\,x]\left(-2\,a\,(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+b\left(-2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\,i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)+4\,b\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(5\,A\,b+11\,a\,B+3\,b\,B\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sin}[c+d\,x]\right)$$

Problem 315: Result unnecessarily involves imaginary or complex numbers.

$$\int (a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^2\,dx$$

Optimal (type 4, 296 leaves, 10 steps):

$$-\left(\left(\left(3 a^2 A-6 A b^2-14 a b B\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+$$

$$\left(\left(3 a^3 A+12 a A b^2+4 a^2 b B+2 b^3 B\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(3 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+$$

$$\frac{a^2 (5 A b+2 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{d \sqrt{a+b \operatorname{Cos}[c+d x]}}-$$

$$\frac{b (3 a A-2 b B) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 d}+$$

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

Result (type 4, 560 leaves) :

$$\frac{1}{12\,d}\left(\left(2\left(36\,a\,A\,b^2+36\,a^2\,b\,B+4\,b^3\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\right.$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\left(27\,a^2\,A\,b+6\,A\,b^3+12\,a^3\,B+14\,a\,b^2\,B\right)\right.$$

$$\left.\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\left(c+d\,x\right),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-$$

$$\left(2\,i\left(-3\,a^2\,A\,b+6\,A\,b^3+14\,a\,b^2\,B\right)\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

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

$$b\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},\,i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d\,x]\right)\Big/$$

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

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

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

Problem 316: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\text{Sec}[c+d\,x]^3\,dx$$

Optimal (type 4, 315 leaves, 10 steps):

$$-\left(\left(\left(9\,a\,A\,b+4\,a^2\,B-8\,b^2\,B\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)\right)+$$

$$\left(\left(11\,a^2\,A\,b+8\,A\,b^3+4\,a^3\,B+16\,a\,b^2\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

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

$$\left(a\,\left(4\,a^2\,A+15\,A\,b^2+20\,a\,b\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

$$\left(4\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\frac{a\,(7\,A\,b+4\,a\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Tan}[c+d\,x]}{4\,d}+$$

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

Result (type 4, 589 leaves) :

$$\frac{1}{16\,d}\left(\left(\left(2\,\left(4\,a^2\,A\,b+16\,A\,b^3+48\,a\,b^2\,B\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\,\frac{2\,b}{a+b}\right]\right)\Big/\right.\right.$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\left(2\,\left(8\,a^3\,A+21\,a\,A\,b^2+36\,a^2\,b\,B+8\,b^3\,B\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right.$$

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

$$\left(2\,i\,\left(-9\,a\,A\,b^2-4\,a^2\,b\,B+8\,b^3\,B\right)\,\sqrt{\frac{b-b\,\text{Cos}[c+d\,x]}{a+b}}\;\sqrt{-\frac{b+b\,\text{Cos}[c+d\,x]}{a-b}}\right.$$

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

$$b\,\left(2\,a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\left.\frac{a+b}{a},\,i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\text{Sin}[c+d\,x]\right)\Big/$$

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

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

$$\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{1}{4}\,\text{Sec}[c+d\,x]\,\left(9\,a\,A\,b\,\text{Sin}[c+d\,x]+4\,a^2\,B\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\left.\frac{1}{2}\,a^2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)$$

Problem 317: Result unnecessarily involves imaginary or complex numbers.

$$\int\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^4\,dx$$

Optimal (type 4, 376 leaves, 11 steps):

$$-\left(\left(\left(16 a^2 A+33 A b^2+54 a b B\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(24 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+$$

$$\left(\left(16 a^3 A+59 a A b^2+66 a^2 b B+48 b^3 B\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/ \left(24 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+$$

$$\left(\left(20 a^2 A b+5 A b^3+8 a^3 B+30 a b^2 B\right) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right) \Big/$$

$$\left(8 d \sqrt{a+b \operatorname{Cos}[c+d x]}\right)+\frac{\left(16 a^2 A+33 A b^2+54 a b B\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Tan}[c+d x]}{24 d}+$$

$$\frac{a(3 A b+2 a B) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x] \operatorname{Tan}[c+d x]}{4 d}+$$

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

Result (type 4, 639 leaves) :

$$\frac{1}{96 d}\left(\left(2\left(52 a A b^2+24 a^2 b B+96 b^3 B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{a+b}}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d x]}\right)+\left(2\left(104 a^2 A b-3 A b^3+48 a^3 B+126 a b^2 B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{a+b}}\,\text{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\text{Cos}[c+d x]}\right)-\left(2\,i\left(-16 a^2 A b-33 A b^3-54 a b^2 B\right)\sqrt{\frac{b-b\,\text{Cos}[c+d x]}{a+b}}\sqrt{-\frac{b+b\,\text{Cos}[c+d x]}{a-b}}\,\text{Cos}[2(c+d x)]\left(2 a(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]+b\left(2 a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\frac{a+b}{a},i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]\right)\right)\text{Sin}[c+d x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+d x]^2}\sqrt{-\frac{a^2-b^2-2 a(a+b\,\text{Cos}[c+d x])+(a+b\,\text{Cos}[c+d x])^2}{b^2}}\left(2 a^2-b^2-4 a(a+b\,\text{Cos}[c+d x])+2(a+b\,\text{Cos}[c+d x])^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\left(\frac{1}{12}\text{Sec}[c+d x]^2\left(13 a A b\,\text{Sin}[c+d x]+6 a^2 B\,\text{Sin}[c+d x]\right)+\frac{1}{24}\text{Sec}[c+d x]\left(16 a^2 A\,\text{Sin}[c+d x]+33 A b^2\,\text{Sin}[c+d x]+54 a b B\,\text{Sin}[c+d x]\right)+\frac{1}{3}a^2 A\,\text{Sec}[c+d x]^2\,\text{Tan}[c+d x]\right)$$

Problem 318: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 465 leaves, 12 steps):

$$-\left(\left(\left(284\, a^2\, A\, b + 15\, A\, b^3 + 128\, a^3\, B + 264\, a\, b^2\, B\right)\sqrt{a + b\, \text{Cos}[c + d\, x]}\ \text{EllipticE}\left[\frac{1}{2}\,(c + d\, x),\, \frac{2\, b}{a + b}\right]\right) \Big/ \left(192\, a\, d\, \sqrt{\frac{a + b\, \text{Cos}[c + d\, x]}{a + b}}\right)\right) +$$

$$\left(\left(356\, a^2\, A\, b + 133\, A\, b^3 + 128\, a^3\, B + 472\, a\, b^2\, B\right)\sqrt{\frac{a + b\, \text{Cos}[c + d\, x]}{a + b}}\ \text{EllipticF}\left[\frac{1}{2}\,(c + d\, x),\, \frac{2\, b}{a + b}\right]\right) \Big/ \left(192\, d\, \sqrt{a + b\, \text{Cos}[c + d\, x]}\right) +$$

$$\left(\left(48\, a^4\, A + 120\, a^2\, A\, b^2 - 5\, A\, b^4 + 160\, a^3\, b\, B + 40\, a\, b^3\, B\right)\sqrt{\frac{a + b\, \text{Cos}[c + d\, x]}{a + b}}\ \text{EllipticPi}\left[2,\, \frac{1}{2}\,(c + d\, x),\, \frac{2\, b}{a + b}\right]\right) \Big/ \left(64\, a\, d\, \sqrt{a + b\, \text{Cos}[c + d\, x]}\right) + \frac{1}{192\, a\, d}$$

$$\left(284\, a^2\, A\, b + 15\, A\, b^3 + 128\, a^3\, B + 264\, a\, b^2\, B\right)\sqrt{a + b\, \text{Cos}[c + d\, x]}\ \text{Tan}[c + d\, x] + \frac{1}{96\, d}$$

$$\left(36\, a^2\, A + 59\, A\, b^2 + 104\, a\, b\, B\right)\sqrt{a + b\, \text{Cos}[c + d\, x]}\ \text{Sec}[c + d\, x]\ \text{Tan}[c + d\, x] +$$

$$\frac{a\,(11\, A\, b + 8\, a\, B)\sqrt{a + b\, \text{Cos}[c + d\, x]}\ \text{Sec}[c + d\, x]^2\, \text{Tan}[c + d\, x]}{24\, d} +$$

$$\frac{a\, A\,(a + b\, \text{Cos}[c + d\, x])^{3/2}\, \text{Sec}[c + d\, x]^3\, \text{Tan}[c + d\, x]}{4\, d}$$

Result (type 4, 729 leaves) :

$$\frac{1}{768\,a\,d}\left(\left(2\left(144 a^3 A b+236 a A b^3+416 a^2 b^2 B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)+\left(2\left(288 a^4 A+436 a^2 A b^2-45 A b^4+832 a^3 b B-24 a b^3 B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\frac{1}{2}(c+d x),\frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-\left(2\,i\left(-284 a^2 A b^2-15 A b^4-128 a^3 b B-264 a b^3 B\right)\sqrt{\frac{b-b\,\mathrm{Cos}[c+d x]}{a+b}}\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d x]}{a-b}}\,\mathrm{Cos}[2(c+d x)]\left(2 a(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]+b\left(2 a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\mathrm{Cos}[c+d x]^2}\sqrt{-\frac{a^2-b^2-2 a\left(a+b\,\mathrm{Cos}[c+d x]\right)+\left(a+b\,\mathrm{Cos}[c+d x]\right)^2}{b^2}}\left(2 a^2-b^2-4 a\left(a+b\,\mathrm{Cos}[c+d x]\right)+2\left(a+b\,\mathrm{Cos}[c+d x]\right)^2\right)\right)\right)+\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\left(\frac{1}{24}\mathrm{Sec}[c+d x]^3\left(17 a A b\,\mathrm{Sin}[c+d x]+8 a^2 B\,\mathrm{Sin}[c+d x]\right)+\frac{1}{96}\mathrm{Sec}[c+d x]^2\left(36 a^2 A\,\mathrm{Sin}[c+d x]+59 A b^2\,\mathrm{Sin}[c+d x]+104 a b B\,\mathrm{Sin}[c+d x]\right)+\frac{1}{192 a}\mathrm{Sec}[c+d x]\left(284 a^2 A b\,\mathrm{Sin}[c+d x]+15 A b^3\,\mathrm{Sin}[c+d x]+128 a^3 B\,\mathrm{Sin}[c+d x]+264 a b^2 B\,\mathrm{Sin}[c+d x]\right)+\frac{1}{4}a^2 A\,\mathrm{Sec}[c+d x]^3\,\mathrm{Tan}[c+d x]\right)$$

Problem 324: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^2}{\sqrt{a + b \operatorname{Cos}[c + d x]}} \, dx$$

Optimal (type 4, 216 leaves, 9 steps):

$$-\frac{A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}} + \frac{A \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{d \sqrt{a + b \operatorname{Cos}[c + d x]}} - \frac{(A b - 2 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \frac{A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]}{a d}$$

Result (type 4, 320 leaves):

$$\frac{1}{4 a d}\left(\frac{2 (-3 A b + 4 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{\sqrt{a + b \operatorname{Cos}[c + d x]}} - \frac{1}{a b \sqrt{-\frac{1}{a+b}}} 2 \, i A \sqrt{-\frac{b (-1 + \operatorname{Cos}[c + d x])}{a + b}} \sqrt{\frac{b (1 + \operatorname{Cos}[c + d x])}{-a + b}} \operatorname{Csc}[c + d x] \left(-2 a (a - b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a + b}} \sqrt{a + b \operatorname{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right] + b \left(-2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a + b}} \sqrt{a + b \operatorname{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right] + b \operatorname{EllipticPi}\left[\frac{a + b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a + b}} \sqrt{a + b \operatorname{Cos}[c + d x]}\right], \frac{a + b}{a - b}\right]\right)\right) + 4 A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]\right)$$

Problem 325: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 299 leaves, 10 steps):

$$\frac{(3 A b - 4 a B) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{4 a^2 d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}} - \frac{(A b - 4 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{4 a d \sqrt{a + b \operatorname{Cos}[c + d x]}} + \left((4 a^2 A + 3 A b^2 - 4 a b B) \sqrt{\frac{a + b \operatorname{Cos}[c + d x]}{a + b}} \operatorname{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a + b}\right]\right) \Big/ \left(4 a^2 d \sqrt{a + b \operatorname{Cos}[c + d x]}\right) - \frac{(3 A b - 4 a B) \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Tan}[c + d x]}{4 a^2 d} + \frac{A \sqrt{a + b \operatorname{Cos}[c + d x]} \operatorname{Sec}[c + d x] \operatorname{Tan}[c + d x]}{2 a d}$$

Result (type 4, 556 leaves):

$$\frac{1}{16\,a^2\,d}\left(\frac{8\,a\,A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\right.$$

$$\left(2\,\left(8\,a^2\,A+9\,A\,b^2-12\,a\,b\,B\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\Big/$$

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

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

$$b\,\left(2\,a\,\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\left.\frac{a+b}{a},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\,\text{Sin}[c+d\,x]\Big)\Big/$$

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

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

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

$$\left.\frac{A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a}\right)$$

Problem 330: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 190 leaves, 7 steps):

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

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

Result (type 4, 614 leaves) :

$$-\left(\left(2 \operatorname{Cos}[c+d x]\left(B+A \operatorname{Sec}[c+d x]\right)\left(-A b^2 \operatorname{Sin}[c+d x]+a b B \operatorname{Sin}[c+d x]\right)\right)\Big/\left(a\left(a^2-b^2\right) d \sqrt{a+b \operatorname{Cos}[c+d x]}\left(A+B \operatorname{Cos}[c+d x]\right)\right)\right)-\frac{1}{2 a(-a+b)(a+b) d\left(A+B \operatorname{Cos}[c+d x]\right)} \operatorname{Cos}[c+d x]\left(B+A \operatorname{Sec}[c+d x]\right)\left(\frac{2\left(-2 a A b+2 a^2 B\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{\sqrt{a+b \operatorname{Cos}[c+d x]}}+\left(2\left(2 a^2 A-3 A b^2+a b B\right)\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right)\Big/\left(\sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(2 i\left(-A b^2+a b B\right)\sqrt{\frac{b-b \operatorname{Cos}[c+d x]}{a+b}}\sqrt{-\frac{b+b \operatorname{Cos}[c+d x]}{a-b}} \operatorname{Cos}[2(c+d x)]\left(2 a(a-b) \operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]+b\left(2 a \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]-b \operatorname{EllipticPi}\left[\frac{a+b}{a}, i \operatorname{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b \operatorname{Cos}[c+d x]}\right], \frac{a+b}{a-b}\right]\right)\right) \operatorname{Sin}[c+d x]\right)\Big/\left(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\operatorname{Cos}[c+d x]^2}\sqrt{-\frac{a^2-b^2-2 a\left(a+b \operatorname{Cos}[c+d x]\right)+\left(a+b \operatorname{Cos}[c+d x]\right)^2}{b^2}}\left(2 a^2-b^2-4 a\left(a+b \operatorname{Cos}[c+d x]\right)+2\left(a+b \operatorname{Cos}[c+d x]\right)^2\right)\right)\right)$$

Problem 331: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 303 leaves, 10 steps):

$$-\left(\left(\left(a^2 A-3 A b^2+2 a b B\right) \sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{EllipticE}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]\right)\Big/\left(a^2\left(a^2-b^2\right) d \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}}\right)\right)+\frac{A \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticF}\left[\frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{a d \sqrt{a+b \operatorname{Cos}[c+d x]}}-$$

$$\frac{(3 A b-2 a B) \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{a+b}} \operatorname{EllipticPi}\left[2, \frac{1}{2}(c+d x), \frac{2 b}{a+b}\right]}{a^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

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

Result (type 4, 608 leaves):

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

$$\left(2 \left(-7 a^2 A b+9 A b^3+4 a^3 B-6 a b^2 B\right) \sqrt{\frac{a+b \text{Cos}[c+d x]}{a+b}}\right.$$

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

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

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

$$b \left(2 a \text{EllipticF}\left[i \text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}} \sqrt{a+b \text{Cos}[c+d x]}\right],\frac{a+b}{a-b}\right]-b \text{EllipticPi}\left[\right.\right.$$

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

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

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

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

Problem 332: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 398 leaves, 11 steps):

$$\left(\left(7\,a^2\,A\,b-15\,A\,b^3-4\,a^3\,B+12\,a\,b^2\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,a^3\,\left(a^2-b^2\right)\,d\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\right)-\frac{(5\,A\,b-4\,a\,B)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]}{4\,a^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\left(\left(4\,a^2\,A+15\,A\,b^2-12\,a\,b\,B\right)\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{a+b}}\;\text{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(4\,a^3\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\frac{b\,\left(7\,a^2\,A\,b-15\,A\,b^3-4\,a^3\,B+12\,a\,b^2\,B\right)\,\text{Sin}[c+d\,x]}{4\,a^3\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{(5\,A\,b-4\,a\,B)\,\text{Tan}[c+d\,x]}{4\,a^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{2\,a\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 678 leaves) :

$$-\frac{1}{16\,a^3\,(-a+b)\,(a+b)\,d}\left(\left(2\,(4\,a^3\,A\,b-20\,a\,A\,b^3+16\,a^2\,b^2\,B)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\bigg/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\left(2\,(8\,a^4\,A+29\,a^2\,A\,b^2-45\,A\,b^4-28\,a^3\,b\,B+36\,a\,b^3\,B)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\right]\right)\bigg/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\left(2\,i\,(7\,a^2\,A\,b^2-15\,A\,b^4-4\,a^3\,b\,B+12\,a\,b^3\,B)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}[2\,(c+d\,x)]\left(2\,a\,(a-b)\,\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]+b\left(2\,a\,\mathrm{EllipticF}\left[i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\frac{a+b}{a},\,i\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\,\frac{a+b}{a-b}\right]\right)\right)\mathrm{Sin}[c+d\,x]\right)\bigg/\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}\,\left(2\,a^2-b^2-4\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+2\,(a+b\,\mathrm{Cos}[c+d\,x])^2\right)\right)\right)+$$

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\left(\frac{\mathrm{Sec}[c+d\,x]\,(-7\,A\,b\,\mathrm{Sin}[c+d\,x]+4\,a\,B\,\mathrm{Sin}[c+d\,x])}{4\,a^3}-\frac{2\,(-A\,b^4\,\mathrm{Sin}[c+d\,x]+a\,b^3\,B\,\mathrm{Sin}[c+d\,x])}{a^3\,(a^2-b^2)\,(a+b\,\mathrm{Cos}[c+d\,x])}+\frac{A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a^2}\right)$$

Problem 338: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(A + B \,\mathrm{Cos}[c + d\,x])\,\mathrm{Sec}[c + d\,x]}{(a + b\,\mathrm{Cos}[c + d\,x])^{5/2}}\, dx$$

Optimal (type 4, 349 leaves, 10 steps):

$$-\left(\left(2\left(7 a^2 A b - 3 A b^3 - 4 a^3 B\right)\sqrt{a + b\,\mathrm{Cos}[c + d\,x]}\ \mathrm{EllipticE}\left[\frac{1}{2}(c + d\,x), \frac{2 b}{a + b}\right]\right) \Big/ \left(3 a^2 \left(a^2 - b^2\right)^2 d \sqrt{\frac{a + b\,\mathrm{Cos}[c + d\,x]}{a + b}}\right)\right) + \frac{2 (A b - a B)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\ \mathrm{EllipticF}\left[\frac{1}{2}(c + d\,x), \frac{2 b}{a+b}\right]}{3 a \left(a^2 - b^2\right) d \sqrt{a + b\,\mathrm{Cos}[c + d\,x]}} + \frac{2 A \sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\ \mathrm{EllipticPi}\left[2, \frac{1}{2}(c + d\,x), \frac{2 b}{a+b}\right]}{a^2 d \sqrt{a + b\,\mathrm{Cos}[c + d\,x]}} + \frac{2 b (A b - a B)\,\mathrm{Sin}[c + d\,x]}{3 a \left(a^2 - b^2\right) d \left(a + b\,\mathrm{Cos}[c + d\,x]\right)^{3/2}} + \frac{2 b \left(7 a^2 A b - 3 A b^3 - 4 a^3 B\right)\mathrm{Sin}[c + d\,x]}{3 a^2 \left(a^2 - b^2\right)^2 d \sqrt{a + b\,\mathrm{Cos}[c + d\,x]}}$$

Result (type 4, 743 leaves):

$$\frac{1}{6\,a^2\,(a-b)^2\,(a+b)^2\,d\,(A+B\,\mathrm{Cos}[c+d\,x])}\mathrm{Cos}[c+d\,x]\,(B+A\,\mathrm{Sec}[c+d\,x])$$

$$\Bigg(\Bigg(2\,(-12\,a^3\,A\,b+4\,a\,A\,b^3+6\,a^4\,B+2\,a^2\,b^2\,B)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\Big]\Bigg)\Big/$$

$$\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+\Bigg(2\,(6\,a^4\,A-19\,a^2\,A\,b^2+9\,A\,b^4+4\,a^3\,b\,B)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}$$

$$\mathrm{EllipticPi}\Big[2,\,\frac{1}{2}\,(c+d\,x),\,\frac{2\,b}{a+b}\Big]\Bigg)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$

$$\Bigg(2\,\mathrm{i}\,(-7\,a^2\,A\,b^2+3\,A\,b^4+4\,a^3\,b\,B)\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}$$

$$\mathrm{Cos}[2\,(c+d\,x)]\,\Bigg(2\,a\,(a-b)\,\mathrm{EllipticE}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\Big],\,\frac{a+b}{a-b}\Big]+$$

$$b\,\Bigg(2\,a\,\mathrm{EllipticF}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\Big],\,\frac{a+b}{a-b}\Big]-b\,\mathrm{EllipticPi}\Big[$$

$$\frac{a+b}{a},\,\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\Big],\,\frac{a+b}{a-b}\Big]\Bigg)\Bigg)\,\mathrm{Sin}[c+d\,x]\Bigg)\Big/$$

$$\Bigg(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,(a+b\,\mathrm{Cos}[c+d\,x])+(a+b\,\mathrm{Cos}[c+d\,x])^2}{b^2}}$$

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

$$\Bigg(\mathrm{Cos}[c+d\,x]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,(B+A\,\mathrm{Sec}[c+d\,x])$$

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

$$\left(2\,(-7\,a^2\,A\,b^2\,\mathrm{Sin}[c+d\,x]+3\,A\,b^4\,\mathrm{Sin}[c+d\,x]+4\,a^3\,b\,B\,\mathrm{Sin}[c+d\,x])\right)\Big/$$

$$\left(3\,a^2\,(a^2-b^2)^2\,(a+b\,\mathrm{Cos}[c+d\,x])\right)\Bigg)\Bigg)\Big/\left(d\,(A+B\,\mathrm{Cos}[c+d\,x])\right)$$

Problem 339: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A + B \cos[c + d x]) \sec[c + d x]^2}{(a + b \cos[c + d x])^{5/2}} \, dx$$

Optimal (type 4, 437 leaves, 11 steps):

$$-\left(\left((3 a^4 A - 26 a^2 A b^2 + 15 A b^4 + 14 a^3 b B - 6 a b^3 B) \sqrt{a + b \cos[c + d x]} \, \text{EllipticE}\left[\frac{1}{2} (c + d x), \frac{2 b}{a + b}\right]\right) \Big/ \left(3 a^3 (a^2 - b^2)^2 d \sqrt{\frac{a + b \cos[c + d x]}{a + b}}\right)\right) + \frac{(3 a^2 A - 5 A b^2 + 2 a b B) \sqrt{\frac{a+b \cos[c+d x]}{a+b}} \, \text{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{3 a^2 (a^2 - b^2) d \sqrt{a + b \cos[c + d x]}} - \frac{(5 A b - 2 a B) \sqrt{\frac{a+b \cos[c+d x]}{a+b}} \, \text{EllipticPi}\left[2, \frac{1}{2} (c + d x), \frac{2 b}{a+b}\right]}{a^3 d \sqrt{a + b \cos[c + d x]}} + \frac{b (3 a^2 A - 5 A b^2 + 2 a b B) \sin[c + d x]}{3 a^2 (a^2 - b^2) d (a + b \cos[c + d x])^{3/2}} + \frac{b (3 a^4 A - 26 a^2 A b^2 + 15 A b^4 + 14 a^3 b B - 6 a b^3 B) \sin[c + d x]}{3 a^3 (a^2 - b^2)^2 d \sqrt{a + b \cos[c + d x]}} + \frac{A \tan[c + d x]}{a d (a + b \cos[c + d x])^{3/2}}$$

Result (type 4, 750 leaves):

$$\frac{1}{12 a^3 (-a + b)^2 (a + b)^2 d} \left(\left(\left(2 (36 a^3 A b^2 - 20 a A b^4 - 24 a^4 b B + 8 a^2 b^3 B) \sqrt{\frac{a + b \cos[c + d x]}{a + b}} \, \text{EllipticF}\left[\frac{1}{2} (c + d x), \frac{2 b}{a + b}\right]\right) \Big/ \left(\sqrt{a + b \cos[c + d x]}\right) + \left(2 (-33 a^4 A b + 86 a^2 A b^3 - 45 A b^5 + 12 a^5 B - 38 a^3 b^2 B + 18 a b^4 B) \sqrt{\frac{a + b \cos[c + d x]}{a + b}}\right.\right.\right.$$

$$\text{EllipticPi}\left[2, \frac{1}{2}(c+dx), \frac{2b}{a+b}\right]\Bigg) \Big/ \left(\sqrt{a+b\,\text{Cos}[c+dx]}\right) -$$

$$\Bigg(2\,i\,\left(-3a^4 A b + 26 a^2 A b^3 - 15 A b^5 - 14 a^3 b^2 B + 6 a b^4 B\right) \sqrt{\frac{b-b\,\text{Cos}[c+dx]}{a+b}}$$

$$\sqrt{-\frac{b+b\,\text{Cos}[c+dx]}{a-b}}\;\text{Cos}[2(c+dx)]$$

$$\Bigg(2a(a-b)\,\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+dx]}\right], \frac{a+b}{a-b}\right] +$$

$$b\left(2a\,\text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+dx]}\right], \frac{a+b}{a-b}\right] - b\,\text{EllipticPi}\left[\right.\right.$$

$$\left.\left.\frac{a+b}{a}, i\,\text{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\sqrt{a+b\,\text{Cos}[c+dx]}\right], \frac{a+b}{a-b}\right]\right)\Bigg)\,\text{Sin}[c+dx]\Bigg) \Big/$$

$$\Bigg(a\sqrt{-\frac{1}{a+b}}\sqrt{1-\text{Cos}[c+dx]^2}\sqrt{-\frac{a^2-b^2-2a(a+b\,\text{Cos}[c+dx])+(a+b\,\text{Cos}[c+dx])^2}{b^2}}$$

$$\left(2a^2-b^2-4a(a+b\,\text{Cos}[c+dx])+2(a+b\,\text{Cos}[c+dx])^2\right)\Bigg)\Bigg) +$$

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+dx]}\;\Bigg(\frac{2\left(-A b^3\,\text{Sin}[c+dx]+a b^2 B\,\text{Sin}[c+dx]\right)}{3a^2(a^2-b^2)(a+b\,\text{Cos}[c+dx])^2} +$$

$$\left(2\left(-10a^2 A b^3\,\text{Sin}[c+dx]+6 A b^5\,\text{Sin}[c+dx]+7a^3 b^2 B\,\text{Sin}[c+dx]-3 a b^4 B\,\text{Sin}[c+dx]\right)\right) \Big/$$

$$\left(3a^3(a^2-b^2)^2(a+b\,\text{Cos}[c+dx])\right) + \frac{A\,\text{Tan}[c+dx]}{a^3}\Bigg)$$

Problem 340: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\text{Cos}[c+dx])\,\text{Sec}[c+dx]^3}{(a+b\,\text{Cos}[c+dx])^{5/2}}\,dx$$

Optimal (type 4, 532 leaves, 12 steps):

$$\left(\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.$$
$$\left.\mathrm{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(12\,a^4\,\left(a^2-b^2\right)^2\,d\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right)-$$
$$\left(\left(27\,a^2\,A\,b-35\,A\,b^3-12\,a^3\,B+20\,a\,b^2\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/$$
$$\left(12\,a^3\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$
$$\left(\left(4\,a^2\,A+35\,A\,b^2-20\,a\,b\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/$$
$$\left(4\,a^4\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\frac{b\,\left(27\,a^2\,A\,b-35\,A\,b^3-12\,a^3\,B+20\,a\,b^2\,B\right)\mathrm{Sin}[c+d\,x]}{12\,a^3\,\left(a^2-b^2\right)\,d\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}-$$
$$\left(b\,\left(33\,a^4\,A\,b-170\,a^2\,A\,b^3+105\,A\,b^5-12\,a^5\,B+104\,a^3\,b^2\,B-60\,a\,b^4\,B\right)\mathrm{Sin}[c+d\,x]\right)\Big/$$
$$\left(12\,a^4\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\frac{(7\,A\,b-4\,a\,B)\,\mathrm{Tan}[c+d\,x]}{4\,a^2\,d\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}+\frac{A\,\mathrm{Sec}[c+d\,x]\,\mathrm{Tan}[c+d\,x]}{2\,a\,d\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}$$

Result (type 4, 820 leaves):

$$\frac{1}{48\,a^4\,(a-b)^2\,(a+b)^2\,d}$$
$$\left(\left(\left(2\,\left(12\,a^5\,A\,b-216\,a^3\,A\,b^3+140\,a\,A\,b^5+144\,a^4\,b^2\,B-80\,a^2\,b^4\,B\right)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\right.\right.\right.$$
$$\left.\mathrm{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)+$$
$$\left(2\,\left(24\,a^6\,A+195\,a^4\,A\,b^2-566\,a^2\,A\,b^4+315\,A\,b^6-132\,a^5\,b\,B+344\,a^3\,b^3\,B-180\,a\,b^5\,B\right)\right.$$
$$\left.\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\mathrm{EllipticPi}\left[2,\frac{1}{2}\,(c+d\,x),\frac{2\,b}{a+b}\right]\right)\Big/\left(\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-$$
$$\left(2\,i\,\left(33\,a^4\,A\,b^2-170\,a^2\,A\,b^4+105\,A\,b^6-12\,a^5\,b\,B+104\,a^3\,b^3\,B-60\,a\,b^5\,B\right)\right.$$
$$\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\,\mathrm{Cos}[2\,(c+d\,x)]$$

$$\Bigg(2\,a\,(a-b)\,\text{EllipticE}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\Big],\,\frac{a+b}{a-b}\Big]+$$

$$b\,\Bigg(2\,a\,\text{EllipticF}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\Big],\,\frac{a+b}{a-b}\Big]-b\,\text{EllipticPi}\Big[$$

$$\frac{a+b}{a},\,\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\Big],\,\frac{a+b}{a-b}\Big]\Bigg)\Bigg)\,\text{Sin}[c+d\,x]\Bigg)\Big/$$

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

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

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\Bigg(\frac{\text{Sec}[c+d\,x]\,(-11\,A\,b\,\text{Sin}[c+d\,x]+4\,a\,B\,\text{Sin}[c+d\,x])}{4\,a^4}-$$

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

$$\left(2\,(-13\,a^2\,A\,b^4\,\text{Sin}[c+d\,x]+9\,A\,b^6\,\text{Sin}[c+d\,x]+10\,a^3\,b^3\,B\,\text{Sin}[c+d\,x]-6\,a\,b^5\,B\,\text{Sin}[c+d\,x])\right)\Big/$$

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

Problem 344: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 179 leaves, 8 steps):

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

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

Result (type 4, 522 leaves):

$$
\begin{aligned}
&B\left(\frac{2\,b^2\,\mathrm{Sin}[c+d\,x]}{a\,\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}-\left(-\frac{4\,a\,b\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\right.\right.\\
&\quad\frac{2\,\left(2\,a^2-3\,b^2\right)\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{a+b}}\;\mathrm{EllipticPi}\left[2,\frac{1}{2}\,\left(c+d\,x\right),\frac{2\,b}{a+b}\right]}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\\
&\quad\left(2\,\mathrm{i}\,b^2\,\sqrt{\frac{b-b\,\mathrm{Cos}[c+d\,x]}{a+b}}\,\sqrt{-\frac{b+b\,\mathrm{Cos}[c+d\,x]}{a-b}}\;\mathrm{Cos}\left[2\,\left(c+d\,x\right)\right]\right.\\
&\quad\quad\left(2\,a\,\left(a-b\right)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]+\right.\\
&\quad\quad\quad b\left(2\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]-b\,\mathrm{EllipticPi}\left[\right.\right.\\
&\quad\quad\quad\quad\left.\left.\left.\left.\frac{a+b}{a},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{-\frac{1}{a+b}}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right],\frac{a+b}{a-b}\right]\right)\right)\,\mathrm{Sin}[c+d\,x]\right)\Bigg/\\
&\quad\left(a\,\sqrt{-\frac{1}{a+b}}\,\sqrt{1-\mathrm{Cos}[c+d\,x]^2}\,\sqrt{-\frac{a^2-b^2-2\,a\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2}{b^2}}\right.\\
&\quad\quad\left.\left.\left.\left(2\,a^2-b^2-4\,a\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)+2\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^2\right)\right)\right)\Bigg/\left(2\,a\,\left(-a+b\right)\,\left(a+b\right)\,d\right)\right)
\end{aligned}
$$

Problem 369: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 86 leaves, 5 steps):

$$-\frac{2\,A\,\mathrm{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]}{a\,d}-\frac{2\,\left(A\,b-a\,B\right)\,\mathrm{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,\left(c+d\,x\right),2\right]}{a\,\left(a+b\right)\,d}+\frac{2\,A\,\mathrm{Sin}[c+d\,x]}{a\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 4, 210 leaves):

$$\frac{1}{2\,a\,d}\left(\frac{2\,(-3\,A\,b+2\,a\,B)\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,(c+d\,x),2\right]}{a+b}-\frac{2\,a\,A\left(2\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]-\frac{2\,a\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,(c+d\,x),2\right]}{a+b}\right)}{b}+\frac{4\,A\,\text{Sin}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}}-\left(2\,A\left(-2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]+2\,a\,(a+b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]+\left(2\,a^2-b^2\right)\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\,b\,\sqrt{\text{Sin}[c+d\,x]^2}\right)\right)$$

Problem 393: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 80 leaves, 6 steps):

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

Result (type 4, 200 leaves):

$$-\frac{1}{2\,a\,d}B\left(\frac{6\,b\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,(c+d\,x),2\right]}{a+b}+\frac{2\,a\left(2\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]-\frac{2\,a\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,(c+d\,x),2\right]}{a+b}\right)}{b}-\frac{4\,\text{Sin}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}}+\left(2\left(-2\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]+2\,a\,(a+b)\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]+\left(2\,a^2-b^2\right)\text{EllipticPi}\left[-\frac{b}{a},-\text{ArcSin}\left[\sqrt{\text{Cos}[c+d\,x]}\right],-1\right]\right)\text{Sin}[c+d\,x]\right)\Big/\left(a\,b\,\sqrt{\text{Sin}[c+d\,x]^2}\right)\right)$$

Problem 395: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

$$\int \cos[c+dx]^{3/2}\sqrt{a+b\cos[c+dx]}\,(A+B\cos[c+dx])\,dx$$

Optimal (type 4, 560 leaves, 8 steps):

$$-\frac{1}{24\,a\,b^2\,d}(a-b)\sqrt{a+b}\,(6\,a\,A\,b-3\,a^2\,B+16\,b^2\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{24\,b^2\,d}\sqrt{a+b}\,(a+2\,b)\,(6\,A\,b-3\,a\,B+8\,b\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{8\,b^3\,d}\sqrt{a+b}\,(2\,a^2\,A\,b-8\,A\,b^3-a^3\,B-4\,a\,b^2\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{(6\,a\,A\,b-3\,a^2\,B+16\,b^2\,B)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,b^2\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{(2\,A\,b-a\,B)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,d}+\frac{B\,\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,b\,d}$$

Result (type 4, 1224 leaves):

$$-\frac{1}{48\,b\,d}\left(-\left(\left(4\,a\,(-18\,a\,A\,b+a^2\,B-16\,b^2\,B)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

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

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

$$\left(-24 A b^2-28 a b B\right)\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

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

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

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

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

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

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

$$2\left(-6 a A b+3 a^2 B-16 b^2 B\right)\left(\left(i\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\Bigg)\Bigg/$$

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

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

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\text{Csc}[c+d x]\,\text{EllipticF}\Bigg[$$

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

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

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

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

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

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d x]}\;\text{Sin}[c+d x]}{b\sqrt{\text{Cos}[c+d x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\left(\frac{(6 A b+a B)\,\text{Sin}[c+d x]}{12 b}+\right.$$

$$\frac{1}{6}$$

$$B$$

$$\text{Sin}\left[2\,(c+d\,x)\right]\Big)$$

Problem 396: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,(A+B\,\text{Cos}[c+d\,x])\,dx$$

Optimal (type 4, 473 leaves, 7 steps):

$$-\frac{1}{4\,a\,b\,d}(a-b)\,\sqrt{a+b}\,(4\,A\,b+a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,b\,d}\sqrt{a+b}\,(4\,A\,b+(a+2\,b)\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b^2\,d}\sqrt{a+b}\,(4\,a\,A\,b-a^2\,B+4\,b^2\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{(4\,A\,b+a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{B\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1175 leaves):

$$\frac{B\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{1}{8\,d}\Bigg(-\Bigg(\Bigg(4\,a\,(4\,A\,b+3\,a\,B)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

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

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,(8\,a\,A+4\,b\,B)$$

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

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

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

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

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

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

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

$$2\,(4\,A\,b+a\,B)\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\right.\right.\right.$$

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

$$\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

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

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

$$\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

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

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

Problem 397: Result more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]\right)}{\sqrt{\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 385 leaves, 6 steps):

$$-\frac{1}{a\,d}(a-b)\sqrt{a+b}\;B\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{d}\sqrt{a+b}\;(2\,A+B)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{b\,d}\sqrt{a+b}\;(2\,A\,b+a\,B)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{B\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{d\,\sqrt{\mathrm{Cos}[c+d\,x]}}$$

Result (type 4, 3054 leaves):

$$\Bigg((1+\mathrm{Cos}[c+d\,x])^{3/2}\left(\frac{A\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{\mathrm{Cos}[c+d\,x]}}+B\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\Bigg(2\,(a+b)\,B\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-4\,(A\,b+a\,(-A+B))\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-8\,A\,b\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]-4\,a\,B\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\;\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$b\,B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$

$$2\,a\,B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-b\,B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)\Bigg)\Bigg/$$

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

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

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-4\,(A\,b+a\,(-A+B))$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-$$

$$8\,A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-$$

$$4\,a\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$b\,B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$

$$2\,a\,B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-b\,B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg)-$$

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

$$\Bigg(2\,(a+b)\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-$$

$$4\,(A\,b+a\,(-A+B))\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]-$$

$$8\,A\,b\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticPi}\Big[-1,\,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]-$$

$$4\,a\,B\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticPi}\Big[-1,\,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]+$$

$$b\,B\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\mathrm{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big]+$$

$$2\,a\,B\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-b\,B\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)+$$

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

$$\Bigg(2\,(a+b)\,B\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]-$$

$$4\,(A\,b+a\,(-A+B))\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]-$$

$$8\,A\,b\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticPi}\Big[-1,\,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]-$$

$$4\,a\,B\,\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}\ \mathrm{EllipticPi}\Big[-1,\,-\mathrm{ArcSin}\Big[\mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\,\frac{-a+b}{a+b}\Big]+$$

$$b\,B\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\mathrm{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big]+$$

$$2\,a\,B\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-b\,B\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \mathrm{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)+$$

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

$$\Bigg(\frac{3}{2}\,b\,B\,\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\ \mathrm{Cos}\Big[\frac{3}{2}\,(c+d\,x)\Big]\,\mathrm{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]+$$

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

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

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

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

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

$$\left(\sqrt{\frac{a+b \text{Cos}[c+d x]}{(a+b)(1+\text{Cos}[c+d x])}}\right)+\frac{1}{2\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}} b B \text{Sec}\left[\frac{1}{2}(c+d x)\right]$$

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

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

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

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

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

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

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

$$\left(2 a B\sqrt{\frac{a+b\operatorname{Cos}[c+d x]}{(a+b)(1+\operatorname{Cos}[c+d x])}}\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right)\Big/$$

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

$$\left((a+b) B\sqrt{\frac{a+b\operatorname{Cos}[c+d x]}{(a+b)(1+\operatorname{Cos}[c+d x])}}\operatorname{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right.$$

$$\left.\left.\left.\sqrt{1-\frac{(-a+b)\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\Big/\left(\sqrt{1-\operatorname{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right)\right)\right)\right)$$

Problem 398: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 351 leaves, 5 steps):

$$\frac{1}{a\,d}2\,A\,(a-b)\,\sqrt{a+b}\;\text{Cot}[c+d\,x]\;\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{a\,d}2\,\sqrt{a+b}\,(A\,b-a\,(A-B))\,\text{Cot}[c+d\,x]\;\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}2\,\sqrt{a+b}\;B\,\text{Cot}[c+d\,x]\;\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}$$

Result (type 4, 1161 leaves):

$$-\left(\left(4\,a^2\,B\,\sqrt{\frac{(a+b)\,\text{Cot}\big[\frac{1}{2}(c+d\,x)\big]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\big[\frac{1}{2}(c+d\,x)\big]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\big[\frac{1}{2}(c+d\,x)\big]^2}{a}}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}[\frac{1}{2}(c+d\,x)]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\Big[\frac{1}{2}(c+d\,x)\Big]^4\right)\Big/\left((a+b)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$\frac{1}{d}4\,a\,(-a\,A+b\,B)\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\big[\frac{1}{2}(c+d\,x)\big]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\big[\frac{1}{2}(c+d\,x)\big]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\big[\frac{1}{2}(c+d\,x)\big]^2}{a}}\;\text{Csc}[c+d\,x]\right.\right.$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Problem 399: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 284 leaves, 4 steps):

$$\frac{1}{3\,a^2\,d}2\,(a-b)\sqrt{a+b}\,(A\,b+3\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,a\,d}$$

$$2\,(a-b)\sqrt{a+b}\,(A-3\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

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

Result (type 4, 1229 leaves):

$$\frac{1}{3\,a\,d}\left(-\left(\left(4\,a\,\left(a^2\,A-A\,b^2\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

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

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

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-a\,A\,b-3\,a^2\,B\right)$$

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

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

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

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

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

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

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

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

$$\left.\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right], -\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right) \Big/$$

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

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

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

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

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

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

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

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

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

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

Problem 400: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\text{Cos}[c+d x]}\ (A+B\,\text{Cos}[c+d x])}{\text{Cos}[c+d x]^{7/2}}\,dx$$

Optimal (type 4, 350 leaves, 5 steps):

$$\frac{1}{15 a^3 d}2 (a-b) \sqrt{a+b} \left(9 a^2 A-2 A b^2+5 a b B\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}-\frac{1}{15 a^2 d}2 (a-b) \sqrt{a+b} (9 a A+2 A b-5 a B) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 A \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{5 d \text{Cos}[c+d x]^{5/2}}+\frac{2 (A b+5 a B) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{15 a d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1315 leaves):

$$-\frac{1}{15 a^2 d}\left(-\left(\left(4 a \left(2 a^2 A b-2 A b^3-5 a^3 B+5 a b^2 B\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right)\Big/\left(\left(a+b\right) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right)-4 a \left(9 a^3 A-2 a A b^2+5 a^2 b B\right)\right.$$

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

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

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

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

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

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

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

$$2\left(9\,a^2\,A\,b-2\,A\,b^3+5\,a\,b^2\,B\right)\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\bigg/$$

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

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

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticF}\Big[$$

$$\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\;\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/$$

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

$$\Bigg(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\Big[-\frac{a}{b},$$

$$\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2\,a}{-a+b}\Big]\;\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\Bigg)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{b\sqrt{\mathrm{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\Bigg(\frac{2\,\mathrm{Sec}[c+d\,x]^2\,(A\,b\,\mathrm{Sin}[c+d\,x]+5\,a\,B\,\mathrm{Sin}[c+d\,x])}{15\,a}+$$

$$\frac{1}{15\,a^2}\,2\,\mathrm{Sec}[c+d\,x]\,\left(9\,a^2\,A\,\mathrm{Sin}[c+d\,x]-2\,A\,b^2\,\mathrm{Sin}[c+d\,x]+5\,a\,b\,B\,\mathrm{Sin}[c+d\,x]\right)+\frac{2}{5}\,A\,\mathrm{Sec}[c+d\,x]^2\,\mathrm{Tan}[c+d\,x]\Bigg)$$

Problem 401: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\left(A+B\,\mathrm{Cos}[c+d\,x]\right)}{\mathrm{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 433 leaves, 6 steps):

$$\frac{1}{105\,a^4\,d}2\,(a-b)\,\sqrt{a+b}\,\left(19\,a^2\,A\,b+8\,A\,b^3+63\,a^3\,B-14\,a\,b^2\,B\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^2+a^2\,(25\,A-63\,B)+2\,a\,b\,(3\,A-7\,B)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{7\,d\,\mathrm{Cos}[c+d\,x]^{7/2}}+\frac{2\,(A\,b+7\,a\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{35\,a\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+\frac{2\,\left(25\,a^2\,A-4\,A\,b^2+7\,a\,b\,B\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{105\,a^2\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1408 leaves):

$$\frac{1}{105\,a^3\,d}\left(-\left(\left(4\,a\,\left(25\,a^4\,A-17\,a^2\,A\,b^2-8\,A\,b^4-14\,a^3\,b\,B+14\,a\,b^3\,B\right)\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-\right.$$

$$4\,a\,\left(-19\,a^3\,A\,b-8\,a\,A\,b^3-63\,a^4\,B+14\,a^2\,b^2\,B\right)$$

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

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]$$

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

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

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

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

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

$$2\left(-19 a^2 A b^2-8 A b^4-63 a^3 b B+14 a b^3 B\right)\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/$$

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

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

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

$$\left.\text{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/$$

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

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

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

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

$$\left.\left.\frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)\right) + \frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}$$

$$\left(\frac{2 \operatorname{Sec}[c+d x]^3 (A b \operatorname{Sin}[c+d x] + 7 a B \operatorname{Sin}[c+d x])}{35 a} + \right.$$

$$\frac{1}{105 a^2}$$
$$2$$
$$\operatorname{Sec}[c+d x]^2$$
$$\left(25 a^2 A \operatorname{Sin}[c+d x] - 4 A b^2 \operatorname{Sin}[c+d x] + 7 a b B \operatorname{Sin}[c+d x]\right) + \frac{1}{105 a^3} 2$$
$$\operatorname{Sec}[c+d x]$$

$$\left(19\,a^2\,A\,b\,\mathrm{Sin}[c+d\,x]+8\,A\,b^3\,\mathrm{Sin}[c+d\,x]+63\,a^3\,B\,\mathrm{Sin}[c+d\,x]-14\,a\,b^2\,B\,\mathrm{Sin}[c+d\,x]\right)+\frac{2}{7}\,A\,\mathrm{Sec}[c+d\,x]^3\,\mathrm{Tan}[c+d\,x]\Bigg)$$

Problem 402: Result unnecessarily involves imaginary or complex numbers.

$$\int \mathrm{Cos}[c+d\,x]^{3/2}\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+B\,\mathrm{Cos}[c+d\,x])\,dx$$

Optimal (type 4, 670 leaves, 9 steps):

$$-\frac{1}{192\,a\,b^2\,d}(a-b)\,\sqrt{a+b}\,\left(24\,a^2\,A\,b+128\,A\,b^3-9\,a^3\,B+156\,a\,b^2\,B\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{192\,b^2\,d}\sqrt{a+b}\,\left(9\,a^3\,B-6\,a^2\,b\,(4\,A+B)-8\,b^3\,(16\,A+9\,B)-4\,a\,b^2\,(28\,A+39\,B)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{64\,b^3\,d}\sqrt{a+b}\,\left(8\,a^3\,A\,b-96\,a\,A\,b^3-3\,a^4\,B-24\,a^2\,b^2\,B-48\,b^4\,B\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\left(\left(24\,a^2\,A\,b+128\,A\,b^3-9\,a^3\,B+156\,a\,b^2\,B\right)\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]\right)\Big/\left(192\,b^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\right)+\frac{1}{32\,b\,d}\left(8\,a\,A\,b-3\,a^2\,B+12\,b^2\,B\right)\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]+\frac{(8\,A\,b-3\,a\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\mathrm{Sin}[c+d\,x]}{24\,b\,d}+\frac{B\,\sqrt{\mathrm{Cos}[c+d\,x]}\,(a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,\mathrm{Sin}[c+d\,x]}{4\,b\,d}$$

Result (type 4, 1284 leaves):

$$-\frac{1}{384\,b\,d}\left(-\left(\left(4\,a\,\left(-136\,a^2\,A\,b-128\,A\,b^3+3\,a^3\,B-228\,a\,b^2\,B\right)\right.\right.\right.$$

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

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

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

$$\left.\left(\left(a+b\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(-416\,a\,A\,b^2-228\,a^2\,b\,B-144\,b^3\,B\right)$$

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

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

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$

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

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

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

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

$$2\,\left(-24\,a^2\,A\,b-128\,A\,b^3+9\,a^3\,B-156\,a\,b^2\,B\right)\,\left(\left(i\,\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\Big[i\,\text{ArcSinh}\Big[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\Big],\ -\frac{2\,a}{-a-b}\Big]\,\text{Sec}[c+d\,x]\right)\Big/$$

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

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

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

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

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

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

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

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

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

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{\left(56\,a\,A\,b+3\,a^2\,B+42\,b^2\,B\right)\,\text{Sin}[c+d\,x]}{96\,b}+\frac{1}{48}\left(8\,A\,b+9\,a\,B\right)\text{Sin}\left[2\,(c+d\,x)\right]+\frac{1}{16}\,b\,B\,\text{Sin}\left[3\,(c+d\,x)\right]\right)$$

Problem 403: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 4, 566 leaves, 8 steps):

$$-\frac{1}{24\,a\,b\,d}(a-b)\sqrt{a+b}\left(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{1}{24\,b\,d}\sqrt{a+b}\left(30\,a\,A\,b+12\,A\,b^2+3\,a^2\,B+14\,a\,b\,B+16\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{8\,b^2\,d}\sqrt{a+b}\left(6\,a^2\,A\,b+8\,A\,b^3-a^3\,B+12\,a\,b^2\,B\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{\left(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{(6\,A\,b+7\,a\,B)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{12\,d}+\frac{b\,B\,\text{Cos}[c+d\,x]^{3/2}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 4, 1227 leaves):

$$\frac{1}{48\,d}\left(-\left(\left(4\,a\left(42\,a\,A\,b+17\,a^2\,B+16\,b^2\,B\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\right.\right.\right.$$

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

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,\left(48\,a^2\,A+24\,A\,b^2+52\,a\,b\,B\right)$$

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

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

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

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

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

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

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

$$2\,\left(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B\right)\,\Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

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

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

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

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

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

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

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

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

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

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\sqrt{a+b\,\text{Cos}[c+d x]}\left(\frac{1}{12}(6 A b+7 a B)\,\text{Sin}[c+d x]+\frac{1}{6}\,b\,B\,\text{Sin}[2(c+d x)]\right)$$

Problem 404: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x])}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 472 leaves, 7 steps):

$$-\frac{1}{4\,a\,d}(a-b)\sqrt{a+b}\,(4\,A\,b+5\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,d}\sqrt{a+b}\,(8\,a\,A+4\,A\,b+5\,a\,B+2\,b\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,b\,d}\sqrt{a+b}\,(12\,a\,A\,b+3\,a^2\,B+4\,b^2\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{(4\,A\,b+5\,a\,B)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\sqrt{\text{Cos}[c+d\,x]}}+\frac{b\,B\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}$$

Result (type 4, 1198 leaves):

$$\frac{b\,B\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{1}{8\,d}\Bigg(-\Bigg(\Bigg(4\,a\,(8\,a^2\,A+4\,A\,b^2+7\,a\,b\,B)\sqrt{\frac{(a+b)\,\text{Cot}\big[\frac{1}{2}(c+d\,x)\big]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\big[\frac{1}{2}(c+d\,x)\big]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\big[\frac{1}{2}(c+d\,x)\big]^2}{a}}\,\text{Csc}[c+d\,x]$$

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

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(16\,a\,A\,b+8\,a^2\,B+4\,b^2\,B\right)$$

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

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

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

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

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

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

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

$$2\left(4 A b^2+5 a b B\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\;\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2\mathrm{Sec}[c+d x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\right)+\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}\;\mathrm{Sin}[c+d x]}{b\sqrt{\mathrm{Cos}[c+d x]}}\right)$$

Problem 405: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a + b \operatorname{Cos}[c + d x])^{3/2} (A + B \operatorname{Cos}[c + d x])}{\operatorname{Cos}[c + d x]^{3/2}} \, dx$$

Optimal (type 4, 449 leaves, 7 steps):

$$\frac{1}{a d}(a-b)\sqrt{a+b}\,(2 a A-b B)\operatorname{Cot}[c+d x]\operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{d}\sqrt{a+b}\,(2 a (A-B)-b(4 A+B))\operatorname{Cot}[c+d x]\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{d}\sqrt{a+b}\,(2 A b+3 a B)\operatorname{Cot}[c+d x]\operatorname{EllipticPi}\left[\frac{a+b}{b},\operatorname{ArcSin}\left[\frac{\sqrt{a+b\operatorname{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{2 a A\sqrt{a+b\operatorname{Cos}[c+d x]}\operatorname{Sin}[c+d x]}{d\sqrt{\operatorname{Cos}[c+d x]}}-\frac{(2 a A-b B)\sqrt{a+b\operatorname{Cos}[c+d x]}\operatorname{Sin}[c+d x]}{d\sqrt{\operatorname{Cos}[c+d x]}}$$

Result (type 4, 1196 leaves):

$$\frac{2 a A\sqrt{a+b\operatorname{Cos}[c+d x]}\operatorname{Sin}[c+d x]}{d\sqrt{\operatorname{Cos}[c+d x]}}+\frac{1}{2 d}\left(\left(4 a\left(-2 a A b-2 a^2 B-b^2 B\right)\sqrt{\frac{(a+b)\operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\operatorname{Cos}[c+d x]\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\operatorname{Csc}[c+d x]\operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left((a+b)\sqrt{\operatorname{Cos}[c+d x]}\sqrt{a+b\operatorname{Cos}[c+d x]}\right)+4 a\left(2 a^2 A-2 A b^2-4 a b B\right)\right.$$

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

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

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

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

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

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

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

$$2\,(2\,a\,A\,b-b^2\,B)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\right.\right.\right.$$

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

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

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

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

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

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

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

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

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

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

Problem 406: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d x])^{3/2}\,(A+B\,\text{Cos}[c+d x])}{\text{Cos}[c+d x]^{5/2}}\,dx$$

Optimal (type 4, 419 leaves, 6 steps):

$$\frac{1}{3\,a\,d}2\,(a-b)\,\sqrt{a+b}\,(4\,A\,b+3\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,a\,d}$$
$$2\,\sqrt{a+b}\,\left(3\,A\,b^2+a^2\,(A-3\,B)-a\,(4\,A\,b-6\,b\,B)\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$
$$2\,b\,\sqrt{a+b}\,B\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1236 leaves):

$$\frac{1}{3\,d}\left(-\left(\left(4\,a\,(a^2\,A-A\,b^2+3\,a\,b\,B)\right.\right.\right.$$
$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$
$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Bigg/$$
$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,(-4\,a\,A\,b-3\,a^2\,B+3\,b^2\,B)$$

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

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

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

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

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

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

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

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

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

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

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

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

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

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

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

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

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

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{3}\text{Sec}[c+d\,x]\,(4\,A\,b\,\text{Sin}[c+d\,x]+3\,a\,B\,\text{Sin}[c+d\,x])+\right.$$

$$\frac{2}{3}$$
$$a$$
$$A$$
$$\text{Sec}[c+d\,x]$$
$$\left.\text{Tan}[c+d\,x]\right)$$

Problem 407: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+B\,\mathrm{Cos}[c+d\,x])}{\mathrm{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 353 leaves, 5 steps):

$$\frac{1}{15\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(9\,a^2\,A+3\,A\,b^2+20\,a\,b\,B\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{15\,a\,d}2\,(a-b)\,\sqrt{a+b}\,(9\,a\,A-3\,A\,b-5\,a\,B+15\,b\,B)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+\frac{2\,(6\,A\,b+5\,a\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1314 leaves):

$$-\frac{1}{15\,a\,d}\left(-\left(\left(4\,a\,\left(-3\,a^2\,A\,b+3\,A\,b^3-5\,a^3\,B+5\,a\,b^2\,B\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\right/$$

$$\Big(\left(a+b\right)\sqrt{\mathrm{Cos}[c+d\,x]}\ \sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\Big)\Bigg) - 4\,a\,\left(9\,a^3\,A+3\,a\,A\,b^2+20\,a^2\,b\,B\right)$$

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

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

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Big/$$

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

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

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

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

$$2\,\left(9\,a^2\,A\,b+3\,A\,b^3+20\,a\,b^2\,B\right)\,\Bigg(\Bigg(i\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\mathrm{Sec}[c+d\,x]\Bigg)\Big/$$

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

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

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

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

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

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

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

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

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

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{2}{15}\,\text{Sec}[c+d\,x]^2\right.$$

$$(6\,A\,b\,\text{Sin}[c+d\,x]+5\,a\,B\,\text{Sin}[c+d\,x])+$$

$$\frac{1}{15\,a}$$

$$2$$

$$\text{Sec}[$$

$$c+d\,x]$$

$$\left(9\,a^2\,A\,\mathrm{Sin}[c+d\,x]+3\,A\,b^2\,\mathrm{Sin}[c+d\,x]+20\,a\,b\,B\,\mathrm{Sin}[c+d\,x]\right)+\frac{2}{5}$$

a

A

$\mathrm{Sec}[c+d\,x]^2$

$\mathrm{Tan}[c+d\,x]\Big)$

Problem 408: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,(A+B\,\mathrm{Cos}[c+d\,x])}{\mathrm{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 433 leaves, 6 steps):

$$\frac{1}{105\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(82\,a^2\,A\,b-6\,A\,b^3+63\,a^3\,B+21\,a\,b^2\,B\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}-\frac{1}{105\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(6\,A\,b^2-a^2\,(25\,A-63\,B)+3\,a\,b\,(19\,A-7\,B)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,A\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{7\,d\,\mathrm{Cos}[c+d\,x]^{7/2}}+\frac{2\,(8\,A\,b+7\,a\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{35\,d\,\mathrm{Cos}[c+d\,x]^{5/2}}+\frac{2\,\left(25\,a^2\,A+3\,A\,b^2+42\,a\,b\,B\right)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{105\,a\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1407 leaves):

$$\frac{1}{105\,a^2\,d}\left(-\left(\left(4\,a\,\left(25\,a^4\,A-31\,a^2\,A\,b^2+6\,A\,b^4+21\,a^3\,b\,B-21\,a\,b^3\,B\right)\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.\right.$$

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

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

$$4 a\left(-82 a^3 A b+6 a A b^3-63 a^4 B-21 a^2 b^2 B\right)$$

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

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

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

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

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

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

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

$$2\left(-82 a^2 A b^2+6 A b^4-63 a^3 b B-21 a b^3 B\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/$$

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

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

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

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

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

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

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

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

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{35}\,\text{Sec}[c+d\,x]^3\,\left(8\,A\,b\,\text{Sin}[c+d\,x]+7\,a\,B\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\frac{1}{105\,a}$$

$$2$$

$$\text{Sec}[c+d\,x]^2$$

$$\left(25\,a^2\,A\,\text{Sin}[c+d\,x]+3\,A\,b^2\,\text{Sin}[c+d\,x]+42\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+\frac{1}{105\,a^2}2$$

$$\text{Sec}[c+d\,x]$$

$$\left(82\,a^2\,A\,b\,\text{Sin}[c+d\,x]-6\,A\,b^3\,\text{Sin}[c+d\,x]+63\,a^3\,B\,\text{Sin}[c+d\,x]+\right.$$

$$\left.\left.21\,a\,b^2\,B\,\text{Sin}[c+d\,x]\right)+\frac{2}{7}\,a\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]\right)$$

Problem 409: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\text{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 522 leaves, 7 steps):

$$\frac{1}{315 a^4 d} 2 (a-b) \sqrt{a+b} \left(147 a^4 A + 33 a^2 A b^2 + 8 A b^4 + 246 a^3 b B - 18 a b^3 B\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b \mathrm{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\mathrm{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\mathrm{Sec}[c+d x])}{a-b}} + \frac{1}{315 a^3 d} 2 (a-b) \sqrt{a+b} \left(8 A b^3 - a^3 (147 A - 75 B) + 3 a^2 b (13 A - 57 B) + 6 a b^2 (A - 3 B)\right) \mathrm{Cot}[c+d x]\, \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b \mathrm{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\mathrm{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\mathrm{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\mathrm{Sec}[c+d x])}{a-b}} + \frac{2 a A \sqrt{a+b \mathrm{Cos}[c+d x]}\, \mathrm{Sin}[c+d x]}{9 d \mathrm{Cos}[c+d x]^{9/2}} + \frac{2 (10 A b + 9 a B) \sqrt{a+b \mathrm{Cos}[c+d x]}\, \mathrm{Sin}[c+d x]}{63 d \mathrm{Cos}[c+d x]^{7/2}} + \frac{2 \left(49 a^2 A + 3 A b^2 + 72 a b B\right) \sqrt{a+b \mathrm{Cos}[c+d x]}\, \mathrm{Sin}[c+d x]}{315 a d \mathrm{Cos}[c+d x]^{5/2}} + \left(2 \left(88 a^2 A b - 4 A b^3 + 75 a^3 B + 9 a b^2 B\right) \sqrt{a+b \mathrm{Cos}[c+d x]}\, \mathrm{Sin}[c+d x]\right) \Big/ \left(315 a^2 d \mathrm{Cos}[c+d x]^{3/2}\right)$$

Result (type 4, 1515 leaves) :

$$-\frac{1}{315 a^3 d} \left(-\left(\left(4 a \left(-39 a^4 A b + 31 a^2 A b^3 + 8 A b^5 - 75 a^5 B + 93 a^3 b^2 B - 18 a b^4 B\right) \sqrt{\frac{(a+b) \mathrm{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \mathrm{Cos}[c+d x] \mathrm{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \mathrm{Cos}[c+d x]) \mathrm{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \mathrm{Csc}[c+d x]\, \mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b \mathrm{Cos}[c+d x]) \mathrm{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \mathrm{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\mathrm{Cos}[c+d x]} \sqrt{a+b \mathrm{Cos}[c+d x]}\right)\right) - 4 a \left(147 a^5 A + 33 a^3 A b^2 + 8 a A b^4 + 246 a^4 b B - 18 a^2 b^3 B\right)$$

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

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

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

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

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

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

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

$$2\left(147\,a^4\,A\,b+33\,a^2\,A\,b^3+8\,A\,b^5+246\,a^3\,b^2\,B-18\,a\,b^4\,B\right)\left(\left(i\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\right.\right.$$

$$\left.\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

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

$$\frac{1}{b} 2 a \left(\left(\left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) - \left(a \sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticPi}\left[-\frac{a}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)\right) + \frac{\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{b \sqrt{\operatorname{Cos}[c+d x]}}\right)\right) +$$

$$\frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]} \left(\frac{2}{63} \operatorname{Sec}[c+d x]^4 (10 A b \operatorname{Sin}[c+d x] + 9 a B \operatorname{Sin}[c+d x]) + \frac{1}{315 a} 2 \operatorname{Sec}[c+d x]^3 \left(49 a^2 A \operatorname{Sin}[c+d x] + 3 A b^2 \operatorname{Sin}[c+d x] + 72 a b B \operatorname{Sin}[c+d x]\right) + \frac{1}{315 a^2} 2 \operatorname{Sec}[c+d x]^2 \left(88 a^2 A b \operatorname{Sin}[c+d x] - 4 A b^3 \operatorname{Sin}[c+d x] + 75 a^3 B \operatorname{Sin}[c+d x] + 9 a b^2 B \operatorname{Sin}[c+d x]\right) + \frac{1}{315 a^3} 2 \operatorname{Sec}[c+d x] \left(147 a^4 A \operatorname{Sin}[c+d x] + 33 a^2 A b^2 \operatorname{Sin}[c+d x] + 8 A b^4 \operatorname{Sin}[c+d x] + \right.\right.$$

$$246\, a^3\, b\, B\, \text{Sin}[c+d\,x] - 18\, a\, b^3\, B\, \text{Sin}[c+d\,x]\Big) + \frac{2}{9}\, a\, A\, \text{Sec}[c+d\,x]^4\, \text{Tan}[c+d\,x]\Big)$$

Problem 410: Result unnecessarily involves imaginary or complex numbers.

$$\int \text{Cos}[c+d\,x]^{3/2}\, \left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\, \left(A+B\,\text{Cos}[c+d\,x]\right)\, dx$$

Optimal (type 4, 779 leaves, 10 steps):

$$-\frac{1}{1920\, a\, b^2\, d}(a-b)\,\sqrt{a+b}\,\left(150\, a^3\, A\, b + 2840\, a\, A\, b^3 - 45\, a^4\, B + 1692\, a^2\, b^2\, B + 1024\, b^4\, B\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\, -\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}} - \frac{1}{1920\, b^2\, d}$$
$$\sqrt{a+b}\,\left(45\, a^4\, B - 30\, a^3\, b\,(5\,A+B) - 16\, b^4\,(45\,A+64\,B) - 8\, a\, b^3\,(355\,A+193\,B) - 4\, a^2\, b^2\,(295\,A+423\,B)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\, -\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}} + \frac{1}{128\, b^3\, d}$$
$$\sqrt{a+b}\,\left(10\, a^4\, A\, b - 240\, a^2\, A\, b^3 - 96\, A\, b^5 - 3\, a^5\, B - 40\, a^3\, b^2\, B - 240\, a\, b^4\, B\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\, \text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\, -\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}} +$$
$$\left(\left(150\, a^3\, A\, b + 2840\, a\, A\, b^3 - 45\, a^4\, B + 1692\, a^2\, b^2\, B + 1024\, b^4\, B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(1920\, b^2\, d\,\sqrt{\text{Cos}[c+d\,x]}\right) + \frac{1}{320\, b\, d}$$
$$\left(50\, a^2\, A\, b + 120\, A\, b^3 - 15\, a^3\, B + 172\, a\, b^2\, B\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x] +$$
$$\frac{1}{240\, b\, d}\left(50\, a\, A\, b - 15\, a^2\, B + 64\, b^2\, B\right)\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x] +$$
$$\frac{(10\,A\,b - 3\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\text{Sin}[c+d\,x]}{40\, b\, d} +$$
$$\frac{B\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{7/2}\,\text{Sin}[c+d\,x]}{5\, b\, d}$$

Result (type 4, 1353 leaves):

$$-\frac{1}{3840\, b\, d}$$

$$\left(-\left(\left(4\,a\,\left(-1330\,a^3\,A\,b-3560\,a\,A\,b^3+15\,a^4\,B-3236\,a^2\,b^2\,B-1024\,b^4\,B\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$

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

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

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

$$4\,a\,\left(-6440\,a^2\,A\,b^2-1440\,A\,b^4-2292\,a^3\,b\,B-4624\,a\,b^3\,B\right)$$

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

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

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

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

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

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

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

$$2\left(-150 a^3 A b - 2840 a A b^3 + 45 a^4 B - 1692 a^2 b^2 B - 1024 b^4 B\right)$$

$$\left(\left(\mathrm{i}\operatorname{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\operatorname{Cos}[c+d x]}\right.\right.$$

$$\left.\operatorname{EllipticE}\left[\mathrm{i}\operatorname{ArcSinh}\left[\frac{\operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{2a}{-a-b}\right]\operatorname{Sec}[c+d x]\right) \Big/$$

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

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

$$\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \operatorname{Csc}[c+d x]\operatorname{EllipticF}\Big[$$

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

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

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

$$\sqrt{\frac{(a+b\operatorname{Cos}[c+d x])\operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \operatorname{Csc}[c+d x]\operatorname{EllipticPi}\Big[-\frac{a}{b},$$

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

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

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{\left(590\,a^2\,A\,b+420\,A\,b^3+15\,a^3\,B+898\,a\,b^2\,B\right)\,\text{Sin}[c+d\,x]}{960\,b}+\right.$$

$$\frac{1}{480}\left(170\,a\,A\,b+93\,a^2\,B+88\,b^2\,B\right)\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{160}\,b\,(10\,A\,b+21\,a\,B)\,\text{Sin}[3\,(c+d\,x)]+\frac{1}{40}\,b^2\,B\,\text{Sin}[4\,(c+d\,x)]\Bigg)$$

Problem 411: Result unnecessarily involves imaginary or complex numbers.

$$\int\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,dx$$

Optimal (type 4, 664 leaves, 9 steps):

$$-\frac{1}{192\,a\,b\,d}\left(a-b\right)\sqrt{a+b}\,\left(264\,a^2\,A\,b+128\,A\,b^3+15\,a^3\,B+284\,a\,b^2\,B\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{192\,b\,d}$$
$$\sqrt{a+b}\,\left(15\,a^3\,B+8\,b^3\,(16\,A+9\,B)+2\,a^2\,b\,(132\,A+59\,B)+4\,a\,b^2\,(52\,A+71\,B)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{64\,b^2\,d}$$
$$\sqrt{a+b}\,\left(40\,a^3\,A\,b+160\,a\,A\,b^3-5\,a^4\,B+120\,a^2\,b^2\,B+48\,b^4\,B\right)\,\text{Cot}[c+d\,x]$$
$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\left(\left(264\,a^2\,A\,b+128\,A\,b^3+15\,a^3\,B+284\,a\,b^2\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(192\,b\,d\,\sqrt{\text{Cos}[c+d\,x]}\right)+\frac{1}{32\,d}$$
$$\left(24\,a\,A\,b+5\,a^2\,B+12\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]+$$
$$\frac{(8\,A\,b+11\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{24\,d}+$$
$$\frac{b\,B\,\text{Cos}[c+d\,x]^{3/2}\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 1287 leaves):

$$\frac{1}{384\,d}\left(-\left(\left(\left(4\,a\,\left(472\,a^2\,A\,b+128\,A\,b^3+133\,a^3\,B+356\,a\,b^2\,B\right)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.\right.$$
$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

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

$$4\,a\,\left(384\,a^3\,A+608\,a\,A\,b^2+644\,a^2\,b\,B+144\,b^3\,B\right)$$

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

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

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

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

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

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

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

$$2\,\left(264\,a^2\,A\,b+128\,A\,b^3+15\,a^3\,B+284\,a\,b^2\,B\right)\left(\left(i\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

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

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

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

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

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

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

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

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

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

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{1}{96}\left(104\,a\,A\,b+59\,a^2\,B+42\,b^2\,B\right)\right.$$

$$\text{Sin}[c+d\,x]+\frac{1}{48}$$

$$b$$

$$(8\,A\,b+17\,a\,B)$$

$$\text{Sin}[2\,(c+d\,x)]+\frac{1}{16}$$

b^2
B
$\text{Sin}[3\,(c+d\,x)]\Big)\Big)$

Problem 412: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])}{\sqrt{\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 564 leaves, 8 steps):

$$-\frac{1}{24\,a\,d}(a-b)\sqrt{a+b}\,\left(54\,a\,A\,b+33\,a^2\,B+16\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\,+$$

$$\frac{1}{24\,d}\sqrt{a+b}\,\left(4\,b^2\,(3\,A+4\,B)+a^2\,(48\,A+33\,B)+a\,(54\,A\,b+26\,b\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\,-$$

$$\frac{1}{8\,b\,d}\sqrt{a+b}\,\left(30\,a^2\,A\,b+8\,A\,b^3+5\,a^3\,B+20\,a\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\,\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\,+$$

$$\frac{\left(54\,a\,A\,b+33\,a^2\,B+16\,b^2\,B\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{24\,d\,\sqrt{\text{Cos}[c+d\,x]}}+$$

$$\frac{b\,(2\,A\,b+3\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}+$$

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

Result (type 4, 1251 leaves):

$$\frac{1}{48\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(48\,a^3\,A+66\,a\,A\,b^2+59\,a^2\,b\,B+16\,b^3\,B\right)$$

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

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

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

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(144\,a^2\,A\,b+24\,A\,b^3+48\,a^3\,B+76\,a\,b^2\,B\right)$$

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

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

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

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

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

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

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

$$2\left(54\,a\,A\,b^2+33\,a^2\,b\,B+16\,b^3\,B\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

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

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

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

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

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

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

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

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

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

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

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\ \left(\frac{1}{12}\,b\,\left(6\,A\,b+13\,a\,B\right)\,\text{Sin}[c+d\,x]+\frac{1}{6}\,b^2\,B\,\text{Sin}\left[2\,\left(c+d\,x\right)\right]\right)$$

Problem 413: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\text{Cos}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 547 leaves, 8 steps):

$$\frac{1}{4\,a\,d}(a-b)\,\sqrt{a+b}\,\left(8\,a^2\,A-4\,A\,b^2-9\,a\,b\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\,\left(8\,a^2\,(A-B)-2\,b^2\,(2\,A+B)-3\,a\,b\,(8\,A+3\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{4\,d}\sqrt{a+b}\,\left(20\,a\,A\,b+15\,a^2\,B+4\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{\left(8\,a^2\,A-4\,A\,b^2-9\,a\,b\,B\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{b\,(4\,a\,A-b\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d}+\frac{2\,a\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1241 leaves):

$$\frac{1}{8\,d}\left(\left(4\,a\,\left(-16\,a^2\,A\,b-4\,A\,b^3-8\,a^3\,B-11\,a\,b^2\,B\right)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+4\,a\,\left(8\,a^3\,A-24\,a\,A\,b^2-24\,a^2\,b\,B-4\,b^3\,B\right)\right.$$

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

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

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

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

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

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

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

$$2\,\left(8\,a^2\,A\,b-4\,A\,b^3-9\,a\,b^2\,B\right)\,\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\mathrm{Sec}[c+d\,x]\right)\Big/$$

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

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\text{Csc}[c+dx]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+dx]\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\text{Csc}[c+dx]\;\text{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+dx])\,\text{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\text{Cos}[c+dx]}\;\text{Sin}[c+dx]}{b\sqrt{\text{Cos}[c+dx]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+dx]}\sqrt{a+b\,\text{Cos}[c+dx]}\left(\frac{1}{2}b^2\,B\,\text{Sin}[c+dx]+\right.$$

2

a^2

A

$$\left.\text{Tan}[c+dx]\right)$$

Problem 414: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 536 leaves, 8 steps):

$$\frac{1}{3\,a\,d}(a-b)\sqrt{a+b}\,\left(14\,a\,A\,b+6\,a^2\,B-3\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}$$

$$\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{3\,d}\sqrt{a+b}\,\left(2\,a\,b\,(7\,A-9\,B)-2\,a^2\,(A-3\,B)-3\,b^2\,(6\,A+B)\right)$$

$$\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$

$$b\,\sqrt{a+b}\,(2\,A\,b+5\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,(2\,A\,b+a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Cos}[c+d\,x]}}-$$

$$\frac{\left(14\,a\,A\,b+6\,a^2\,B-3\,b^2\,B\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Cos}[c+d\,x]}}+\frac{2\,a\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1269 leaves):

$$\frac{1}{6\,d}\Bigg(-\Bigg(\Bigg(4\,a\,\left(2\,a^3\,A+4\,a\,A\,b^2+12\,a^2\,b\,B+3\,b^3\,B\right)$$

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

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

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

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg) - 4\,a\,\left(-14\,a^2\,A\,b+6\,A\,b^3-6\,a^3\,B+18\,a\,b^2\,B\right)$$

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

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

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

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

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

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

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

$$2\,\left(-14\,a\,A\,b^2-6\,a^2\,b\,B+3\,b^3\,B\right)\,\Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}\,(c+d x)\right]\,\sqrt{a+b\,\text{Cos}[c+d x]}$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],\ -\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d x]\Bigg)\Bigg/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\;\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{(a+b)\;\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\;\mathrm{Cos}[c+d\,x]\;\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\;\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\;\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\Big/$$

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

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

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\;\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

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

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{b\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}$$

$$\left(\frac{2}{3}\,\mathrm{Sec}[c+d\,x]\;\left(7\,a\,A\,b\,\mathrm{Sin}[c+d\,x]+3\,a^2\,B\,\mathrm{Sin}[c+d\,x]\right)+\right.$$

$$\frac{2}{3}$$

a^2

A

$\text{Sec}[c+d\,x]$

$\text{Tan}[c+d\,x]\Big)$

Problem 415: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{7/2}}\,dx$$

Optimal (type 4, 493 leaves, 7 steps):

$$\frac{1}{15\,a\,d}2\,(a-b)\,\sqrt{a+b}\,\left(9\,a^2\,A+23\,A\,b^2+35\,a\,b\,B\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{15\,a\,d}$$
$$2\,\sqrt{a+b}\,\left(15\,A\,b^3-a\,b^2\,(23\,A-45\,B)+a^2\,b\,(17\,A-35\,B)-a^3\,(9\,A-5\,B)\right)$$
$$\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}$$
$$2\,b^2\,\sqrt{a+b}\,B\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\,\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{2\,a\,(8\,A\,b+5\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Cos}[c+d\,x]^{5/2}}$$

Result (type 4, 1319 leaves):

$$\frac{1}{15\,d}\Bigg(\Bigg(4\,a\,\left(-8\,a^2\,A\,b+8\,A\,b^3-5\,a^3\,B-10\,a\,b^2\,B\right)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}$$
$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[$$

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

$$\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+4\,a\,\left(9\,a^3\,A+23\,a\,A\,b^2+35\,a^2\,b\,B-15\,b^3\,B\right)$$

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

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

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

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

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

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

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

$$2\,\left(9\,a^2\,A\,b+23\,A\,b^3+35\,a\,b^2\,B\right)\,\Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

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

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

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

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

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

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

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

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

$$\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\Bigg(\frac{2}{15}\,\text{Sec}[c+d\,x]^2\,\left(11\,a\,A\,b\,\text{Sin}[c+d\,x]+5\,a^2\,B\,\text{Sin}[c+d\,x]\right)+$$

$$\frac{2}{15}\,\text{Sec}[c+d\,x]\,\left(9\,a^2\,A\,\text{Sin}[c+d\,x]+23\,A\,b^2\,\text{Sin}[c+d\,x]+35\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+\frac{2}{5}\,a^2\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]\Bigg)$$

Problem 416: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{9/2}}\,dx$$

Optimal (type 4, 434 leaves, 6 steps):

$$\frac{1}{105\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(145\,a^2\,A\,b+15\,A\,b^3+63\,a^3\,B+161\,a\,b^2\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{105\,a\,d}2\,(a-b)\,\sqrt{a+b}\,\left(a^2\,(25\,A-63\,B)+15\,b^2\,(A-7\,B)-8\,a\,b\,(15\,A-7\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\,\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,(10\,A\,b+7\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{35\,d\,\text{Cos}[c+d\,x]^{5/2}}+\frac{2\,\left(25\,a^2\,A+45\,A\,b^2+77\,a\,b\,B\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d\,\text{Cos}[c+d\,x]^{3/2}}+\frac{2\,a\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{7\,d\,\text{Cos}[c+d\,x]^{7/2}}$$

Result (type 4, 1409 leaves):

$$\frac{1}{105\,a\,d}\left(-\left(\left(4\,a\,\left(25\,a^4\,A-10\,a^2\,A\,b^2-15\,A\,b^4+56\,a^3\,b\,B-56\,a\,b^3\,B\right)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$

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

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

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

$$4\,a\,\left(-145\,a^3\,A\,b-15\,a\,A\,b^3-63\,a^4\,B-161\,a^2\,b^2\,B\right)$$

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

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

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

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

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

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

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

$$
\begin{aligned}
&2\left(-145\,a^2\,A\,b^2-15\,A\,b^4-63\,a^3\,b\,B-161\,a\,b^3\,B\right)\Bigg(\Bigg(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\\
&\quad\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\mathrm{Sec}[c+d\,x]\Bigg)\Big/\\
&\quad\left(b\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\mathrm{Sec}[c+d\,x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]}{a+b}}\right)+\\
&\quad\frac{1}{b}\,2\,a\Bigg(\Bigg(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\\
&\qquad\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\\
&\qquad\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Big/\\
&\qquad\left((a+b)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)-\Bigg(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\\
&\qquad\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\\
&\qquad\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\\
&\qquad\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Big/\left(b\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\right)\Bigg)+
\end{aligned}
$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{35}\,\text{Sec}[c+d\,x]^3\,\left(15\,a\,A\,b\,\text{Sin}[c+d\,x]+7\,a^2\,B\,\text{Sin}[c+d\,x]\right)+\frac{2}{105}\,\text{Sec}[c+d\,x]^2\,\left(25\,a^2\,A\,\text{Sin}[c+d\,x]+45\,A\,b^2\,\text{Sin}[c+d\,x]+77\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+\frac{1}{105\,a}\,2\,\text{Sec}[c+d\,x]\,\left(145\,a^2\,A\,b\,\text{Sin}[c+d\,x]+15\,A\,b^3\,\text{Sin}[c+d\,x]+63\,a^3\,B\,\text{Sin}[c+d\,x]+161\,a\,b^2\,B\,\text{Sin}[c+d\,x]\right)+\frac{2}{7}\,a^2\,A\,\text{Sec}[c+d\,x]^3\,\text{Tan}[c+d\,x]\right)$$

Problem 417: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])}{\text{Cos}[c+d\,x]^{11/2}}\,dx$$

Optimal (type 4, 522 leaves, 7 steps):

$$\frac{1}{315\,a^3\,d}2\,(a-b)\,\sqrt{a+b}\,\left(147\,a^4\,A+279\,a^2\,A\,b^2-10\,A\,b^4+435\,a^3\,b\,B+45\,a\,b^3\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{315\,a^2\,d}2\,(a-b)\,\sqrt{a+b}\,\left(10\,A\,b^3-6\,a^2\,b\,(19\,A-60\,B)+3\,a^3\,(49\,A-25\,B)+15\,a\,b^2\,(11\,A-3\,B)\right)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,(4\,A\,b+3\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{21\,d\,\text{Cos}[c+d\,x]^{7/2}}+\frac{2\,\left(49\,a^2\,A+75\,A\,b^2+135\,a\,b\,B\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{315\,d\,\text{Cos}[c+d\,x]^{5/2}}+\left(2\,\left(163\,a^2\,A\,b+5\,A\,b^3+75\,a^3\,B+135\,a\,b^2\,B\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]\right)\Big/\left(315\,a\,d\,\text{Cos}[c+d\,x]^{3/2}\right)+\frac{2\,a\,A\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{9\,d\,\text{Cos}[c+d\,x]^{9/2}}$$

Result (type 4, 1517 leaves):

$$-\frac{1}{315\,a^2\,d}\left(-\left(\left(4\,a\,\left(-114\,a^4\,A\,b+124\,a^2\,A\,b^3-10\,A\,b^5-75\,a^5\,B+30\,a^3\,b^2\,B+45\,a\,b^4\,B\right)\right.\right.\right.$$

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

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

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

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

$$4\,a\,\left(147\,a^5\,A+279\,a^3\,A\,b^2-10\,a\,A\,b^4+435\,a^4\,b\,B+45\,a^2\,b^3\,B\right)$$

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

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

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

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

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

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

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

$$2\left(147 a^4 A b+279 a^2 A b^3-10 A b^5+435 a^3 b^2 B+45 a b^4 B\right)$$

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

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right], -\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right) \Big/$$

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

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

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

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

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

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

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

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

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

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\frac{2}{63}\,\text{Sec}[c+d\,x]^4\right.$$

$$\left(19\,a\,A\,b\,\text{Sin}[c+d\,x]+9\,a^2\,B\,\text{Sin}[c+d\,x]\right)+\frac{2}{315}$$

$$\text{Sec}[c+d\,x]^3$$

$$\left(49\,a^2\,A\,\text{Sin}[c+d\,x]+75\,A\,b^2\,\text{Sin}[c+d\,x]+135\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+$$

$$\frac{1}{315\,a}2\,\text{Sec}[c+d\,x]^2\,\left(163\,a^2\,A\,b\,\text{Sin}[c+d\,x]+5\,A\,b^3\,\text{Sin}[c+d\,x]+\right.$$

$$\left.75\,a^3\,B\,\text{Sin}[c+d\,x]+135\,a\,b^2\,B\,\text{Sin}[c+d\,x]\right)+\frac{1}{315\,a^2}$$

$$2\,\text{Sec}[c+d\,x]\,\left(147\,a^4\,A\,\text{Sin}[c+d\,x]+279\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]-10\,A\,b^4\,\text{Sin}[c+d\,x]+\right.$$

$$\left.\left.435\,a^3\,b\,B\,\text{Sin}[c+d\,x]+45\,a\,b^3\,B\,\text{Sin}[c+d\,x]\right)+\frac{2}{9}\,a^2\,A\,\text{Sec}[c+d\,x]^4\,\text{Tan}[c+d\,x]\right)$$

Problem 418: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\text{Cos}[c+d\,x]^{13/2}}\,dx$$

Optimal (type 4, 622 leaves, 8 steps):

$$\frac{1}{3465 a^4 d} 2 (a-b) \sqrt{a+b} \left(3705 a^4 A b+255 a^2 A b^3+40 A b^5+1617 a^5 B+3069 a^3 b^2 B-110 a b^4 B\right) \text{Cot}[c+d x] \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{1}{3465 a^3 d} 2 (a-b) \sqrt{a+b} \left(40 A b^4+3 a^4 (225 A-539 B)-6 a^3 b (505 A-209 B)+15 a^2 b^2 (19 A-121 B)+10 a b^3 (3 A-11 B)\right) \text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}+\frac{2 a (14 A b+11 a B) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{99 d \text{Cos}[c+d x]^{9/2}}+\frac{2 \left(81 a^2 A+113 A b^2+209 a b B\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{693 d \text{Cos}[c+d x]^{7/2}}+\left(2 \left(1145 a^2 A b+15 A b^3+539 a^3 B+825 a b^2 B\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]\right) \Big/ \left(3465 a d \text{Cos}[c+d x]^{5/2}\right)+\left(2 \left(675 a^4 A+1025 a^2 A b^2-20 A b^4+1793 a^3 b B+55 a b^3 B\right) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]\right) \Big/ \left(3465 a^2 d \text{Cos}[c+d x]^{3/2}\right)+\frac{2 a A (a+b \text{Cos}[c+d x])^{3/2} \text{Sin}[c+d x]}{11 d \text{Cos}[c+d x]^{11/2}}$$

Result (type 4, 1640 leaves):

$$\frac{1}{3465 a^3 d}\Bigg(-\Bigg(\Bigg(4 a \left(675 a^6 A-390 a^4 A b^2-245 a^2 A b^4-40 A b^6+1254 a^5 b B-1364 a^3 b^3 B+110 a b^5 B\right) \sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\Bigg) \Big/$$

$$\left.\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-$$

$$4\,a\left(-3705\,a^5\,A\,b-255\,a^3\,A\,b^3-40\,a\,A\,b^5-1617\,a^6\,B-3069\,a^4\,b^2\,B+110\,a^2\,b^4\,B\right)$$

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

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

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

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

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

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

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

$$2\left(-3705\,a^4\,A\,b^2-255\,a^2\,A\,b^4-40\,A\,b^6-1617\,a^5\,b\,B-3069\,a^3\,b^3\,B+110\,a\,b^5\,B\right)$$

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

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

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

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

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

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

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

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

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

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

$$\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2}{99}\,\text{Sec}[c+d\,x]^5\,\left(23\,a\,A\,b\,\text{Sin}[c+d\,x]+11\,a^2\,B\,\text{Sin}[c+d\,x]\right)+\right.$$

$$\frac{2}{693}\,\text{Sec}[c+d\,x]^4\,\left(81\,a^2\,A\,\text{Sin}[c+d\,x]+113\,A\,b^2\,\text{Sin}[c+d\,x]+209\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+$$
$$\frac{1}{3465\,a}2\,\text{Sec}[c+d\,x]^3\,\left(1145\,a^2\,A\,b\,\text{Sin}[c+d\,x]+15\,A\,b^3\,\text{Sin}[c+d\,x]+539\,a^3\,B\,\text{Sin}[c+d\,x]+825\,a\,b^2\,B\,\text{Sin}[c+d\,x]\right)+$$
$$\frac{1}{3465\,a^2}2\,\text{Sec}[c+d\,x]^2\,\left(675\,a^4\,A\,\text{Sin}[c+d\,x]+1025\,a^2\,A\,b^2\,\text{Sin}[c+d\,x]-20\,A\,b^4\,\text{Sin}[c+d\,x]+1793\,a^3\,b\,B\,\text{Sin}[c+d\,x]+55\,a\,b^3\,B\,\text{Sin}[c+d\,x]\right)+$$
$$\frac{1}{3465\,a^3}2\,\text{Sec}[c+d\,x]\,\left(3705\,a^4\,A\,b\,\text{Sin}[c+d\,x]+255\,a^2\,A\,b^3\,\text{Sin}[c+d\,x]+40\,A\,b^5\,\text{Sin}[c+d\,x]+1617\,a^5\,B\,\text{Sin}[c+d\,x]+3069\,a^3\,b^2\,B\,\text{Sin}[c+d\,x]-110\,a\,b^4\,B\,\text{Sin}[c+d\,x]\right)+\frac{2}{11}\,a^2\,A\,\text{Sec}[c+d\,x]^5\,\text{Tan}[c+d\,x]\Big)$$

Problem 419: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 418 leaves, 6 steps):

$$\frac{1}{a\,d}2\,(a-b)\,\sqrt{a+b}\,\left(a^2+3\,b^2\right)\,B\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{a\,d}(a-3\,b)\,\sqrt{a+b}\,\left(2\,a^2-a\,b+3\,b^2\right)\,B\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{d}b\,\sqrt{a+b}\,\left(5\,a+\frac{3\,b^2}{a}\right)\,B\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{b\,B\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{d\,\text{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1236 leaves):

$$-\frac{1}{2\,a\,d}B\left(-\left(\left(4\,a\,\left(-5\,a^3\,b-3\,a\,b^3\right)\right.\right.\right.$$

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

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

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

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

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

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

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

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

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

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

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

$$2\left(2 a^3 b+6 a b^3\right)\left(\left(\mathrm{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\;\text{EllipticE}\left[\right.\right.\right.$$

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

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

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

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

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

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

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

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

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

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

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(\text{Sec}[c+d\,x]\,\left(2\,a^2\,B\,\text{Sin}[c+d\,x]+7\,b^2\,B\,\text{Sin}[c+d\,x]\right)+a\,b\,B\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]\right)$$

Problem 420: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 479 leaves, 7 steps):

$$-\frac{1}{4\,a\,b^2\,d}(a-b)\,\sqrt{a+b}\,(4\,A\,b-3\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{4\,b^2\,d}$$

$$\sqrt{a+b}\,(4\,A\,b-3\,a\,B+2\,b\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$

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

$$\text{Cot}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\,\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\,-\frac{a+b}{a-b}\Big]$$

$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$

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

Result (type 4, 1175 leaves):

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

$$\frac{1}{8\,b\,d}\Bigg(-\Bigg(\Bigg(4\,a\,(4\,A\,b-a\,B)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

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

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

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

$$16\,a\,b\,B\,\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

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

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

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

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

$$\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\Big[-\frac{a}{b},\;\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\;-\frac{2\,a}{-a+b}\Big]$$

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

$$2\,(4\,A\,b-3\,a\,B)\left(\left(\mathrm{i}\,\mathrm{Cos}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\Big[\right.\right.$$

$$\left.\mathrm{i}\,\mathrm{ArcSinh}\Big[\frac{\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],\;-\frac{2\,a}{-a-b}\Big]\;\mathrm{Sec}[c+d\,x]\right)\Big/$$

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

$$\frac{1}{b}\,2\,a\left(\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

$$\left.\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\;-\frac{2\,a}{-a+b}\Big]\;\mathrm{Sin}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]^4\right)\Big/$$

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

$$\left(a\,\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\;\mathrm{EllipticPi}\Big[-\frac{a}{b},$$

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

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

Problem 421: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\,(A+B\,\text{Cos}[c+d\,x])}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 427 leaves, 7 steps):

$$-\frac{1}{a\,b\,d}(a-b)\,\sqrt{a+b}\;B\,\text{Cot}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{b\,d}$$
$$\sqrt{a+b}\;B\,\text{Cot}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^2\,d}$$
$$\sqrt{a+b}\;(2\,A\,b-a\,B)\,\text{Cot}[c+d\,x]\;\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+$$
$$\frac{a\,B\,\text{Sin}[c+d\,x]}{b\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{B\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 4017 leaves):

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

$$\operatorname{Sec}\left[\frac{1}{2}\left(c+d x\right)\right]^2 \left(2 i \left(a-b\right) B \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{\left(a+b\right)\left(1+\operatorname{Cos}[c+d x]\right)}}\right.$$

$$\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right], -\frac{a+b}{a-b}\right] + 4 i \left(A b - a B\right)$$

$$\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{\left(a+b\right)\left(1+\operatorname{Cos}[c+d x]\right)}} \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right], -\frac{a+b}{a-b}\right] -$$

$$8 i A b \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{\left(a+b\right)\left(1+\operatorname{Cos}[c+d x]\right)}} \operatorname{EllipticPi}\left[\frac{a+b}{a-b},\right.$$

$$\left. i \operatorname{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right], -\frac{a+b}{a-b}\right] + 4 i a B \sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{\left(a+b\right)\left(1+\operatorname{Cos}[c+d x]\right)}}$$

$$\operatorname{EllipticPi}\left[\frac{a+b}{a-b}, i \operatorname{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right], -\frac{a+b}{a-b}\right] +$$

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

$$2 a \sqrt{\frac{a-b}{a+b}} B \sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}} \operatorname{Tan}\left[\frac{1}{2}\left(c+d x\right)\right] -$$

$$\left.\left. b \sqrt{\frac{a-b}{a+b}} B \sqrt{\frac{\operatorname{Cos}[c+d x]}{1+\operatorname{Cos}[c+d x]}} \operatorname{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right)\right) \Big/$$

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

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

$$\operatorname{EllipticE}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right], -\frac{a+b}{a-b}\right] + 4 i \left(A b - a B\right)$$

$$\sqrt{\frac{a+b \operatorname{Cos}[c+d x]}{\left(a+b\right)\left(1+\operatorname{Cos}[c+d x]\right)}} \operatorname{EllipticF}\left[i \operatorname{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}} \operatorname{Tan}\left[\frac{1}{2}\left(c+d x\right)\right]\right],\right.$$

$$-\frac{a+b}{a-b}\Big]-8\,\mathrm{i}\,A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{EllipticPi}\Big[\frac{a+b}{a-b},$$

$$\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],-\frac{a+b}{a-b}\Big]+4\,\mathrm{i}\,a\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticPi}\Big[\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],-\frac{a+b}{a-b}\Big]+$$

$$b\,\sqrt{\frac{a-b}{a+b}}\;B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\text{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big]+2\,a\,\sqrt{\frac{a-b}{a+b}}\;B$$

$$\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]-b\,\sqrt{\frac{a-b}{a+b}}\;B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Bigg)-$$

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

$$\Bigg(2\,\mathrm{i}\,(a-b)\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{EllipticE}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],$$

$$-\frac{a+b}{a-b}\Big]+4\,\mathrm{i}\,(A\,b-a\,B)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticF}\Big[\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],-\frac{a+b}{a-b}\Big]-$$

$$8\,\mathrm{i}\,A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}\;\text{EllipticPi}\Big[\frac{a+b}{a-b},$$

$$\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],-\frac{a+b}{a-b}\Big]+4\,\mathrm{i}\,a\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{(a+b)\,(1+\text{Cos}[c+d\,x])}}$$

$$\text{EllipticPi}\Big[\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],-\frac{a+b}{a-b}\Big]+$$

$$b\,\sqrt{\frac{a-b}{a+b}}\;B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\;\text{Sec}\Big[\frac{1}{2}\,(c+d\,x)\Big]\,\text{Sin}\Big[\frac{3}{2}\,(c+d\,x)\Big]+2\,a\,\sqrt{\frac{a-b}{a+b}}\;B$$

$$\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-b\,\sqrt{\frac{a-b}{a+b}}\ B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\Bigg)+$$

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

$$\Bigg(2\,\mathrm{i}\,\left(a-b\right)\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\,\left(1+\text{Cos}[c+d\,x]\right)}}\ \text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\right.$$

$$\left.-\frac{a+b}{a-b}\right]+4\,\mathrm{i}\,\left(A\,b-a\,B\right)\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\,\left(1+\text{Cos}[c+d\,x]\right)}}$$

$$\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\right]-$$

$$8\,\mathrm{i}\,A\,b\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\,\left(1+\text{Cos}[c+d\,x]\right)}}\ \text{EllipticPi}\left[\frac{a+b}{a-b},\right.$$

$$\left.\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\right]+4\,\mathrm{i}\,a\,B\,\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\,\left(1+\text{Cos}[c+d\,x]\right)}}$$

$$\text{EllipticPi}\left[\frac{a+b}{a-b},\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\right]+$$

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

$$\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-b\,\sqrt{\frac{a-b}{a+b}}\ B\,\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\Bigg)+$$

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

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

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

$$\frac{1}{2}b\sqrt{\frac{a-b}{a+b}}\ B\sqrt{\frac{\text{Cos}[c+d\,x]}{1+\text{Cos}[c+d\,x]}}\ \text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2+\Bigg(\mathbb{i}\left(a-b\right)B\,\text{EllipticE}\Big[$$

$$\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\Big]\left(-\frac{b\,\text{Sin}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}+\right.$$

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

$$\Bigg(2\,\mathbb{i}\left(A\,b-a\,B\right)\text{EllipticF}\left[\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\right]$$

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

$$\left(\sqrt{\frac{a+b\,\text{Cos}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}}\right)-\Bigg(4\,\mathbb{i}\,A\,b\,\text{EllipticPi}\Big[\frac{a+b}{a-b},$$

$$\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\Big]\left(-\frac{b\,\text{Sin}[c+d\,x]}{\left(a+b\right)\left(1+\text{Cos}[c+d\,x]\right)}+\right.$$

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

$$\Bigg(2\,\mathbb{i}\,a\,B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\mathbb{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],-\frac{a+b}{a-b}\right]$$

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

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

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

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

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

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

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

$$\left((a-b) \sqrt{\frac{a-b}{a+b}}\, B \sqrt{\frac{a+b \text{Cos}[c+d x]}{(a+b) (1+\text{Cos}[c+d x])}}\, \text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \sqrt{1-\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}\right) \Bigg/ \left(\sqrt{1+\frac{(a-b) \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{a+b}}\right)+$$

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

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

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

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

Problem 423: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 230 leaves, 3 steps):

$$\frac{1}{a^2\,d}2\,A\,(a-b)\,\sqrt{a+b}\,\text{Cot}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{a\,d}2\,\sqrt{a+b}\,(A-B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}$$

Result (type 4, 1164 leaves):

$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{a\,d\,\sqrt{\text{Cos}[c+d\,x]}}-\frac{1}{a\,d}\Bigg(-\Bigg(\Bigg(4\,a\,(A\,b-a\,B)\,\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],-\frac{2\,a}{-a+b}\Big]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

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

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\bigg/$$

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

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

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

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

$$2 A b\left(\left(i\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\;\mathrm{EllipticE}\left[i\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],\right.\right.\right.$$

$$\left.\left.-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\bigg/$$

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

$$
\begin{aligned}
&\frac{1}{b}2\,a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.\\
&\quad\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\\
&\quad\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\\
&\quad\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\\
&\quad\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\\
&\quad\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\right.\\
&\quad\left.\left.\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\\
&\quad\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)
\end{aligned}
$$

Problem 424: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{5/2}\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 290 leaves, 4 steps):

$$-\frac{1}{3 a^3 d} 2 (a-b) \sqrt{a+b} \, (2 A b - 3 a B) \, \text{Cot}[c+d x] \, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Cos}[c+d x]}}{\sqrt{a+b} \, \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{1}{3 a^2 d} 2 \sqrt{a+b} \, (2 A b + a (A - 3 B)) \, \text{Cot}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \, \text{Cos}[c+d x]}}{\sqrt{a+b} \, \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} + \frac{2 A \sqrt{a+b \, \text{Cos}[c+d x]} \, \text{Sin}[c+d x]}{3 a d \, \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1238 leaves):

$$\frac{1}{3 a^2 d} \left(- \left(\left(4 a \left(a^2 A + 2 A b^2 - 3 a b B\right) \sqrt{\frac{(a+b) \, \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \, \text{Cos}[c+d x] \, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \, \text{Cos}[c+d x]) \, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \, \text{Csc}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \, \text{Cos}[c+d x]) \, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4 \right) \Big/ \left((a+b) \sqrt{\text{Cos}[c+d x]} \, \sqrt{a+b \, \text{Cos}[c+d x]} \right) \right) - 4 a \left(2 a A b - 3 a^2 B\right) \left(\left(\sqrt{\frac{(a+b) \, \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \, \text{Cos}[c+d x] \, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \, \text{Cos}[c+d x]) \, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \, \text{Csc}[c+d x] \, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \, \text{Cos}[c+d x]) \, \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4 \right) \Big/ \right.$$

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

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

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

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

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

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\right)\Big/$$

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

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

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

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

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

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

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

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

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

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

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,a}\right)$$

Problem 425: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\text{Cos}[c+d\,x]^{7/2}\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 363 leaves, 5 steps):

$$\frac{1}{15 a^4 d} 2 (a-b) \sqrt{a+b} \left(9 a^2 A + 8 A b^2 - 10 a b B\right) \text{Cot}[c+d x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}}$$
$$\sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} - \frac{1}{15 a^3 d} 2 \sqrt{a+b} \left(8 A b^2 + a^2 (9 A - 5 B) - 2 a b (A + 5 B)\right)$$
$$\text{Cot}[c+d x] \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}} +$$
$$\frac{2 A \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{5 a d \text{Cos}[c+d x]^{5/2}} - \frac{2 (4 A b - 5 a B) \sqrt{a+b \text{Cos}[c+d x]} \text{Sin}[c+d x]}{15 a^2 d \text{Cos}[c+d x]^{3/2}}$$

Result (type 4, 1319 leaves):

$$-\frac{1}{15 a^3 d} \left(-\left(\left(4 a \left(7 a^2 A b + 8 A b^3 - 5 a^3 B - 10 a b^2 B\right)\right.\right.\right.$$
$$\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}$$
$$\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \text{Csc}[c+d x]$$
$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b \text{Cos}[c+d x]) \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \text{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/$$
$$\left.\left((a+b) \sqrt{\text{Cos}[c+d x]} \sqrt{a+b \text{Cos}[c+d x]}\right)\right) - 4 a \left(9 a^3 A + 8 a A b^2 - 10 a^2 b B\right)$$
$$\left(\left(\sqrt{\frac{(a+b) \text{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \text{Cos}[c+d x] \text{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}\right.\right.$$

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

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

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

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

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

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

$$2\,\left(9\,a^2\,A\,b+8\,A\,b^3-10\,a\,b^2\,B\right)\,\left(\left(\text{i}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\text{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Big/$$

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

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

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

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

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

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

$$\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\Bigg(\frac{2\,\text{Sec}[c+d\,x]^2\,(-4\,A\,b\,\text{Sin}[c+d\,x]+5\,a\,B\,\text{Sin}[c+d\,x])}{15\,a^2}+$$

$$\frac{1}{15\,a^3}\,2\,\text{Sec}[c+d\,x]\left(9\,a^2\,A\,\text{Sin}[c+d\,x]+8\,A\,b^2\,\text{Sin}[c+d\,x]-10\,a\,b\,B\,\text{Sin}[c+d\,x]\right)+\frac{2\,A\,\text{Sec}[c+d\,x]^2\,\text{Tan}[c+d\,x]}{5\,a}\Bigg)$$

Problem 426: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 500 leaves, 7 steps):

$$\frac{1}{a\,b^2\sqrt{a+b}\,d}\left(2\,a\,A\,b-3\,a^2\,B+b^2\,B\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^2\sqrt{a+b}\,d}\left(2\,A\,b-(3\,a+b)\,B\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{1}{b^3\,d}\sqrt{a+b}\,(2\,A\,b-3\,a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{2\,a\,(A\,b-a\,B)\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,(a^2-b^2)\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{\left(2\,a\,A\,b-3\,a^2\,B+b^2\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b^2\,(a^2-b^2)\,d\sqrt{\text{Cos}[c+d\,x]}}$$

Result (type 4, 1234 leaves):

$$\frac{2\sqrt{\text{Cos}[c+d\,x]}\,\left(-a\,A\,b\,\text{Sin}[c+d\,x]+a^2\,B\,\text{Sin}[c+d\,x]\right)}{b\,(-a^2+b^2)\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{1}{2\,(a-b)\,b\,(a+b)\,d}\left(-\left(\left(4\,a\,(a^2\,B-b^2\,B)\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\right/\right.$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg) - 4\,a\left(-2\,A\,b^2+2\,a\,b\,B\right)$$

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

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

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

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

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

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

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

$$2\left(-2\,a\,A\,b+3\,a^2\,B-b^2\,B\right)\Bigg(\Bigg(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\text{Sec}[c+d\,x]\Bigg)\Big/$$

$$\Bigg(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]}{a+b}}\Bigg)+$$

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

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

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

$$\Big((a+b)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\Big)-$$

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

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

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

$$\Big(b\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\Big)\Bigg)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\Bigg)\Bigg)$$

Problem 427: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{\text{Cos}[c+d\,x]}\;(A+B\,\text{Cos}[c+d\,x])}{(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 416 leaves, 6 steps):

$$-\frac{1}{a b \sqrt{a+b}\, d} 2 (A b-a B) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{1}{a b \sqrt{a+b}\, d} 2 (A b-a B) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}-\frac{1}{b^2 d} 2 \sqrt{a+b}\, B \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}+\frac{2 a (A b-a B) \operatorname{Sin}[c+d x]}{b \left(a^2-b^2\right) d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}}$$

Result (type 4, 1012 leaves):

$$\frac{2 \sqrt{\operatorname{Cos}[c+d x]} (-A b \operatorname{Sin}[c+d x]+a B \operatorname{Sin}[c+d x])}{\left(a^2-b^2\right) d \sqrt{a+b \operatorname{Cos}[c+d x]}}-\frac{1}{(-a+b)(a+b) d}\left(-4 a (a A-b B)\left(\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.\right.$$

$$\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\Big[-\frac{a}{b},\,\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}[\frac{1}{2}(c+d x)]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2 a}{-a+b}\Big]$$

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

$$2\,(A b-a B)\Bigg(\Bigg(\mathrm{i}\,\mathrm{Cos}\Big[\frac{1}{2}(c+d x)\Big]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\,\mathrm{EllipticE}\Big[$$

$$\mathrm{i}\,\mathrm{ArcSinh}\Big[\frac{\mathrm{Sin}[\frac{1}{2}(c+d x)]}{\sqrt{\mathrm{Cos}[c+d x]}}\Big],\,-\frac{2 a}{-a-b}\Big]\,\mathrm{Sec}[c+d x]\Bigg)\Bigg/$$

$$\Bigg(b\sqrt{\mathrm{Cos}\Big[\frac{1}{2}(c+d x)\Big]^2\mathrm{Sec}[c+d x]}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\Bigg)+$$

$$\frac{1}{b}2 a\Bigg(\Bigg(a\sqrt{\frac{(a+b)\,\mathrm{Cot}[\frac{1}{2}(c+d x)]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}[\frac{1}{2}(c+d x)]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}[\frac{1}{2}(c+d x)]^2}{a}}\,\mathrm{Csc}[c+d x]$$

$$\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}[\frac{1}{2}(c+d x)]^2}{a}}}{\sqrt{2}}\Big],\,-\frac{2 a}{-a+b}\Big]\,\mathrm{Sin}\Big[\frac{1}{2}(c+d x)\Big]^4\Bigg)\Bigg/$$

$$\Big((a+b)\sqrt{\mathrm{Cos}[c+d x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d x]}\Big)-$$

$$\Bigg(a\sqrt{\frac{(a+b)\,\mathrm{Cot}[\frac{1}{2}(c+d x)]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}[\frac{1}{2}(c+d x)]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}[\frac{1}{2}(c+d x)]^2}{a}}\,\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\Big[-\frac{a}{b},$$

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

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

Problem 428: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\sqrt{\text{Cos}[c+d\,x]}\,(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 284 leaves, 4 steps):

$$\frac{1}{a^2\sqrt{a+b}\,d}2\,(A\,b-a\,B)\,\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}+\frac{1}{a\,\sqrt{a+b}\,d}$$
$$2\,(A+B)\,\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}-\frac{2\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{(a^2-b^2)\,d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1223 leaves):

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

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

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

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

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

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

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

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

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

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

$$2\left(-A\,b^2+a\,b\,B\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{EllipticE}\left[\right.\right.\right.$$

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

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\mathrm{Sec}[c+d\,x]}\;\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]}{a+b}}\right)+$$

$$\frac{1}{b}\,2\,a\left(\left(a\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\;\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]$$

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

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

$$\left(a\sqrt{\frac{\left(a+b\right)\mathrm{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\;\sqrt{-\frac{\left(a+b\right)\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\right.$$

$$\sqrt{\frac{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\;\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

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

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

Problem 429: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 305 leaves, 4 steps):

$$\frac{1}{a^3 \sqrt{a+b}\; d} 2 \left(a^2 A - 2 A b^2 + a b B\right) \operatorname{Cot}[c + d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a \left(1 - \operatorname{Sec}[c + d x]\right)}{a+b}} \sqrt{\frac{a \left(1 + \operatorname{Sec}[c + d x]\right)}{a-b}} - \frac{1}{a^2 \sqrt{a+b}\; d} 2 \left(2 A b + a \left(A - B\right)\right) \operatorname{Cot}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a + b \operatorname{Cos}[c + d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c + d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a \left(1 - \operatorname{Sec}[c + d x]\right)}{a+b}} \sqrt{\frac{a \left(1 + \operatorname{Sec}[c + d x]\right)}{a-b}} + \frac{2 b \left(A b - a B\right) \operatorname{Sin}[c + d x]}{a \left(a^2 - b^2\right) d \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + b \operatorname{Cos}[c + d x]}}$$

Result (type 4, 1281 leaves):

$$\frac{1}{a^2 \left(-a + b\right) \left(a + b\right) d} \left(-\left(\left(4 a \left(2 a^2 A b - 2 A b^3 - a^3 B + a b^2 B\right) \sqrt{\frac{\left(a + b\right) \operatorname{Cot}\left[\frac{1}{2} \left(c + d x\right)\right]^2}{-a + b}} \sqrt{-\frac{\left(a + b\right) \operatorname{Cos}[c + d x] \operatorname{Csc}\left[\frac{1}{2} \left(c + d x\right)\right]^2}{a}} \sqrt{\frac{\left(a + b \operatorname{Cos}[c + d x]\right) \operatorname{Csc}\left[\frac{1}{2} \left(c + d x\right)\right]^2}{a}} \operatorname{Csc}[c + d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{\left(a + b \operatorname{Cos}[c + d x]\right) \operatorname{Csc}\left[\frac{1}{2} \left(c + d x\right)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a + b}\right] \operatorname{Sin}\left[\frac{1}{2} \left(c + d x\right)\right]^4\right) \Big/ \left(\left(a + b\right) \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + b \operatorname{Cos}[c + d x]}\right)\right) - 4 a \left(a^3 A - 2 a A b^2 + a^2 b B\right)$$

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

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

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

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

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

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

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

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

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\Bigg)\Bigg/$$

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

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}$$

$$\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]$$

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

$$\left.\left.\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\;\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)+\frac{1}{d}\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}$$

$$\left(\frac{2\left(-A\,b^3\,\mathrm{Sin}[c+dx]+a\,b^2\,B\,\mathrm{Sin}[c+dx]\right)}{a^2\left(a^2-b^2\right)(a+b\,\mathrm{Cos}[c+dx])}+\right.$$

$$\left.\frac{2\,A\,\mathrm{Tan}[c+dx]}{a^2}\right)$$

Problem 430: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + B\,\mathrm{Cos}[c + d\,x]}{\mathrm{Cos}[c + d\,x]^{5/2}\,(a + b\,\mathrm{Cos}[c + d\,x])^{3/2}}\,dx$$

Optimal (type 4, 393 leaves, 5 steps):

$$-\frac{1}{3\,a^4\,\sqrt{a+b}\,d}2\,\left(5\,a^2\,A\,b - 8\,A\,b^3 - 3\,a^3\,B + 6\,a\,b^2\,B\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{3\,a^3\,\sqrt{a+b}\,d}2\,(a+2\,b)\,\left(4\,A\,b + a\,(A-3\,B)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{2\,b\,(A\,b-a\,B)\,\mathrm{Sin}[c+d\,x]}{a\,(a^2-b^2)\,d\,\mathrm{Cos}[c+d\,x]^{3/2}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{2\,(a^2\,A - 4\,A\,b^2 + 3\,a\,b\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,(a^2-b^2)\,d\,\mathrm{Cos}[c+d\,x]^{3/2}}$$

Result (type 4, 1357 leaves):

$$\frac{1}{3\,a^3\,(a-b)\,(a+b)\,d}\left(-\left(\left(4\,a\,\left(a^4\,A + 7\,a^2\,A\,b^2 - 8\,A\,b^4 - 6\,a^3\,b\,B + 6\,a\,b^3\,B\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)\right/\right.\right.$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,\left(5\,a^3\,A\,b-8\,a\,A\,b^3-3\,a^4\,B+6\,a^2\,b^2\,B\right)$$

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

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

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

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

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

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

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

$$2\,\left(5\,a^2\,A\,b^2-8\,A\,b^4-3\,a^3\,b\,B+6\,a\,b^3\,B\right)\,\Bigg(\Bigg(i\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\Bigg)\Big/$$

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

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

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

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

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

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

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

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

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\sqrt{a+b\,\text{Cos}[c+d\,x]}$$

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

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

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]\,\text{Tan}[c+d\,x]}{3\,a^2}\right)$$

Problem 431: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{5/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 674 leaves, 8 steps):

$$\left(\left(6\,a^3\,A\,b-14\,a\,A\,b^3-15\,a^4\,B+26\,a^2\,b^2\,B-3\,b^4\,B\right)\right.$$
$$\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/\left(3\,a\,\left(a-b\right)\,b^3\,\left(a+b\right)^{3/2}\,d\right)-$$
$$\left(\left(6\,a^2\,A\,b+2\,a\,A\,b^2-12\,A\,b^3-15\,a^3\,B-5\,a^2\,b\,B+21\,a\,b^2\,B+3\,b^3\,B\right)\,\text{Cot}[c+d\,x]\right.$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}$$
$$\left.\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\right)\Big/\left(3\,\left(a-b\right)\,b^3\,\left(a+b\right)^{3/2}\,d\right)-\frac{1}{b^4\,d}$$
$$\sqrt{a+b}\,\left(2\,A\,b-5\,a\,B\right)\,\text{Cot}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a\,\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\,\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}+$$
$$\frac{2\,a\,\left(A\,b-a\,B\right)\,\text{Cos}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,b\,\left(a^2-b^2\right)\,d\,\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}+$$
$$\frac{2\,a\,\left(2\,a^2\,A\,b-6\,A\,b^3-5\,a^3\,B+9\,a\,b^2\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,b^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$
$$\left(\left(6\,a^3\,A\,b-14\,a\,A\,b^3-15\,a^4\,B+26\,a^2\,b^2\,B-3\,b^4\,B\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]\right)\Big/$$
$$\left(3\,b^3\,\left(a^2-b^2\right)^2\,d\,\sqrt{\text{Cos}[c+d\,x]}\right)$$

Result (type 4, 1396 leaves) :

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \left(-\frac{2\left(-a^2 A b\,\text{Sin}[c+d x]+a^3 B\,\text{Sin}[c+d x]\right)}{3 b^2\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d x]\right)^2}-\left(2\left(-3 a^3 A b\,\text{Sin}[c+d x]+7 a A b^3\,\text{Sin}[c+d x]+6 a^4 B\,\text{Sin}[c+d x]-10 a^2 b^2 B\,\text{Sin}[c+d x]\right)\right)\Big/\left(3 b^2\left(-a^2+b^2\right)^2\left(a+b\,\text{Cos}[c+d x]\right)\right)\right)+$$

$$\frac{1}{6\left(a-b\right)^2 b^2\left(a+b\right)^2 d}\left(-\left(\left(4 a\left(-2 a^3 A b+2 a A b^3+5 a^4 B-8 a^2 b^2 B+3 b^4 B\right)\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{-a+b}}\ \sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}\ \sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]^4\right)\Big/\left(\left(a+b\right)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)-4 a\left(2 a^2 A b^2+6 A b^4+4 a^3 b B-12 a b^3 B\right)\right.$$

$$\left(\left(\sqrt{\frac{\left(a+b\right)\text{Cot}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{-a+b}}\ \sqrt{-\frac{\left(a+b\right)\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}\ \sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{\left(a+b\,\text{Cos}[c+d x]\right)\text{Csc}\left[\frac{1}{2}\left(c+d x\right)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}\left(c+d x\right)\right]^4\right)\Big/\right.$$

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

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

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

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

$$2\,\left(-6\,a^3\,A\,b+14\,a\,A\,b^3+15\,a^4\,B-26\,a^2\,b^2\,B+3\,b^4\,B\right)\,\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]}{\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{2\,a}{-a-b}\right]\,\text{Sec}[c+d\,x]\right)\Bigg/$$

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

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

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

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

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

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

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\ \text{Csc}[c+d\,x]\ \text{EllipticPi}\Big[-\frac{a}{b},$$

$$\left.\text{ArcSin}\Big[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\Big],\ -\frac{2\,a}{-a+b}\Big]\ \text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)+\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sin}[c+d\,x]}{b\sqrt{\text{Cos}[c+d\,x]}}\right)\right)$$

Problem 432: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{Cos}[c+d\,x]^{3/2}\,(A+B\,\text{Cos}[c+d\,x])}{(a+b\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 4, 545 leaves, 7 steps):

$$\left(2\left(4 A b^3+3 a^3 B-7 a b^2 B\right) \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\right.$$
$$\left.\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a(a-b) b^2(a+b)^{3/2} d\right)+$$
$$\left(2\left(a A b^2-3 A b^3-3 a^3 B-a^2 b B+6 a b^2 B\right) \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],\right.\right.$$
$$\left.\left.-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a(a-b) b^2(a+b)^{3/2} d\right)-$$
$$\frac{1}{b^3 d} 2 \sqrt{a+b}\, B \operatorname{Cot}[c+d x] \operatorname{EllipticPi}\left[\frac{a+b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}+$$
$$\frac{2 a(A b-a B) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d(a+b \operatorname{Cos}[c+d x])^{3/2}}-$$
$$\frac{2 a\left(4 A b^3+3 a^3 B-7 a b^2 B\right) \operatorname{Sin}[c+d x]}{3 b^2\left(a^2-b^2\right)^2 d \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}}$$

Result (type 4, 1342 leaves):

$$\frac{1}{d} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\left(\frac{2\left(-a A b \operatorname{Sin}[c+d x]+a^2 B \operatorname{Sin}[c+d x]\right)}{3 b\left(-a^2+b^2\right)(a+b \operatorname{Cos}[c+d x])^2}+\right.$$
$$\left.\frac{2\left(4 A b^3 \operatorname{Sin}[c+d x]+3 a^3 B \operatorname{Sin}[c+d x]-7 a b^2 B \operatorname{Sin}[c+d x]\right)}{3 b\left(-a^2+b^2\right)^2(a+b \operatorname{Cos}[c+d x])}\right)-$$
$$\frac{1}{3(a-b)^2 b(a+b)^2 d}\left(-\left(\left(4 a\left(-a^2 A b+A b^3+a^3 B-a b^2 B\right)\right.\right.\right.$$
$$\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$
$$\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\,\left(4\,a\,A\,b^2-a^2\,b\,B-3\,b^3\,B\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(4 A b^3+3 a^3 B-7 a b^2 B\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\;\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2\mathrm{Sec}[c+d x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\right)+\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left(b\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}\;\mathrm{Sin}[c+d x]}{b\sqrt{\mathrm{Cos}[c+d x]}}\right)\right)$$

Problem 433: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\left(a+b\,\text{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 391 leaves, 5 steps):

$$-\left(\left(2\left(3\,a^2\,A+A\,b^2-4\,a\,b\,B\right)\text{Cot}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^2\,(a-b)\,(a+b)^{3/2}\,d\right)\right)+$$
$$\left(2\left(3\,a\,A-A\,b+a\,B-3\,b\,B\right)\text{Cot}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a\,(a-b)\,(a+b)^{3/2}\,d\right)-$$
$$\frac{2\,(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\left(a^2-b^2\right)d\left(a+b\,\text{Cos}[c+d\,x]\right)^{3/2}}+\frac{2\left(3\,a^2\,A+A\,b^2-4\,a\,b\,B\right)\text{Sin}[c+d\,x]}{3\left(a^2-b^2\right)^2 d\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1335 leaves):

$$\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{2\left(-A\,b\,\text{Sin}[c+d\,x]+a\,B\,\text{Sin}[c+d\,x]\right)}{3\left(a^2-b^2\right)\left(a+b\,\text{Cos}[c+d\,x]\right)^2}-\right.$$
$$\left.\frac{2\left(3\,a^2\,A\,b\,\text{Sin}[c+d\,x]+A\,b^3\,\text{Sin}[c+d\,x]-4\,a\,b^2\,B\,\text{Sin}[c+d\,x]\right)}{3\,a\left(a^2-b^2\right)^2\left(a+b\,\text{Cos}[c+d\,x]\right)}\right)+$$
$$\frac{1}{3\,a\,(a-b)^2\,(a+b)^2\,d}\left(-\left(\left(4\,a\left(-a^2\,A\,b+A\,b^3+a^3\,B-a\,b^2\,B\right)\right.\right.\right.$$
$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$
$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left.\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)-4\,a\left(3\,a^3\,A+a\,A\,b^2-4\,a^2\,b\,B\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\,\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d\,x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]^4\right)\Big/\left(b\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$2\left(3a^2Ab+Ab^3-4ab^2B\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{\mathrm{Cos}[c+dx]}}\right],-\frac{2a}{-a-b}\right]\mathrm{Sec}[c+dx]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+dx)\right]^2\mathrm{Sec}[c+dx]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]$$

$$\left.\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+dx)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+dx]\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}\;\mathrm{Csc}[c+dx]\,\mathrm{EllipticPi}\left[-\frac{a}{b},\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+dx])\,\mathrm{Csc}\left[\frac{1}{2}(c+dx)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+dx)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+b\,\mathrm{Cos}[c+dx]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+dx]}\,\mathrm{Sin}[c+dx]}{b\sqrt{\mathrm{Cos}[c+dx]}}\right)\right)$$

Problem 434: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + B\,\mathrm{Cos}[c + d\,x]}{\sqrt{\mathrm{Cos}[c + d\,x]}\,(a + b\,\mathrm{Cos}[c + d\,x])^{5/2}}\,dx$$

Optimal (type 4, 429 leaves, 5 steps):

$$\left(2\,(6\,a^2\,A\,b - 2\,A\,b^3 - 3\,a^3\,B - a\,b^2\,B)\,\mathrm{Cot}[c + d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a + b\,\mathrm{Cos}[c + d\,x]}}{\sqrt{a + b}\,\sqrt{\mathrm{Cos}[c + d\,x]}}\right], -\frac{a + b}{a - b}\right]\sqrt{\frac{a\,(1 - \mathrm{Sec}[c + d\,x])}{a + b}}\,\sqrt{\frac{a\,(1 + \mathrm{Sec}[c + d\,x])}{a - b}}\right) \Big/ \left(3\,a^3\,(a - b)\,(a + b)^{3/2}\,d\right) - \left(2\,(2\,A\,b^2 - 3\,a^2\,(A + B) + a\,b\,(3\,A + B))\,\mathrm{Cot}[c + d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a + b\,\mathrm{Cos}[c + d\,x]}}{\sqrt{a + b}\,\sqrt{\mathrm{Cos}[c + d\,x]}}\right], -\frac{a + b}{a - b}\right]\sqrt{\frac{a\,(1 - \mathrm{Sec}[c + d\,x])}{a + b}}\,\sqrt{\frac{a\,(1 + \mathrm{Sec}[c + d\,x])}{a - b}}\right) \Big/ \left(3\,a^2\,\sqrt{a + b}\,(a^2 - b^2)\,d\right) + \frac{2\,b\,(A\,b - a\,B)\,\sqrt{\mathrm{Cos}[c + d\,x]}\,\mathrm{Sin}[c + d\,x]}{3\,a\,(a^2 - b^2)\,d\,(a + b\,\mathrm{Cos}[c + d\,x])^{3/2}} - \frac{2\,(6\,a^2\,A\,b - 2\,A\,b^3 - 3\,a^3\,B - a\,b^2\,B)\,\mathrm{Sin}[c + d\,x]}{3\,a\,(a^2 - b^2)^2\,d\,\sqrt{\mathrm{Cos}[c + d\,x]}\,\sqrt{a + b\,\mathrm{Cos}[c + d\,x]}}$$

Result (type 4, 1384 leaves):

$$\frac{1}{d}\sqrt{\mathrm{Cos}[c + d\,x]}\,\sqrt{a + b\,\mathrm{Cos}[c + d\,x]}\left(-\frac{2\,(-A\,b^2\,\mathrm{Sin}[c + d\,x] + a\,b\,B\,\mathrm{Sin}[c + d\,x])}{3\,a\,(a^2 - b^2)\,(a + b\,\mathrm{Cos}[c + d\,x])^2} - \left(2\,(-6\,a^2\,A\,b^2\,\mathrm{Sin}[c + d\,x] + 2\,A\,b^4\,\mathrm{Sin}[c + d\,x] + 3\,a^3\,b\,B\,\mathrm{Sin}[c + d\,x] + a\,b^3\,B\,\mathrm{Sin}[c + d\,x])\right) \Big/ \left(3\,a^2\,(a^2 - b^2)^2\,(a + b\,\mathrm{Cos}[c + d\,x])\right)\right) +$$

$$\frac{1}{3\,a^2\,(a - b)^2\,(a + b)^2\,d}\left(-\left(\left(4\,a\,(3\,a^4\,A - 5\,a^2\,A\,b^2 + 2\,A\,b^4 - a^3\,b\,B + a\,b^3\,B)\right.\right.\right.$$

$$\sqrt{\frac{(a + b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{-a + b}}\,\sqrt{-\frac{(a + b)\,\mathrm{Cos}[c + d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a + b\,\mathrm{Cos}[c + d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c + d\,x)\right]^2}{a}}\,\mathrm{Csc}[c + d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-4\,a\,\left(-6\,a^3\,A\,b+2\,a\,A\,b^3+3\,a^4\,B+a^2\,b^2\,B\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}\,\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)-\Bigg(\sqrt{\frac{\left(a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{\left(a+b\right)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Csc}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]$$

$$\text{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4\Bigg)\Bigg/\left(b\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$2\left(-6 a^2 A b^2+2 A b^4+3 a^3 b B+a b^3 B\right)\left(\left(\mathrm{i}\, \mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\;\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2 a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2\mathrm{Sec}[c+d x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\right)+\right.$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]\;\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-\right.$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\;\mathrm{Csc}[c+d x]\;\mathrm{EllipticPi}\left[-\frac{a}{b},\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}\;\mathrm{Sin}[c+d x]}{b\sqrt{\mathrm{Cos}[c+d x]}}\right)\right)$$

Problem 435: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\mathrm{Cos}[c+d\,x]}{\mathrm{Cos}[c+d\,x]^{3/2}\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{5/2}}\,dx$$

Optimal (type 4, 456 leaves, 5 steps):

$$\left(2\left(3\,a^4\,A-15\,a^2\,A\,b^2+8\,A\,b^4+6\,a^3\,b\,B-2\,a\,b^3\,B\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^4\,(a-b)\,(a+b)^{3/2}\,d\right)+$$
$$\left(2\left(8\,A\,b^3-3\,a^3\,(A-B)+2\,a\,b^2\,(3\,A-B)-3\,a^2\,b\,(3\,A+B)\right)\,\mathrm{Cot}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/$$
$$\left(3\,a^3\,\sqrt{a+b}\,\left(a^2-b^2\right)\,d\right)+\frac{2\,b\,(A\,b-a\,B)\,\mathrm{Sin}[c+d\,x]}{3\,a\,\left(a^2-b^2\right)\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)^{3/2}}+$$
$$\frac{2\,b\,\left(8\,a^2\,A\,b-4\,A\,b^3-5\,a^3\,B+a\,b^2\,B\right)\,\mathrm{Sin}[c+d\,x]}{3\,a^2\,\left(a^2-b^2\right)^2\,d\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 4, 1431 leaves):

$$-\frac{1}{3\,a^3\,(a-b)^2\,(a+b)^2\,d}$$
$$\left(-\left(\left(4\,a\left(9\,a^4\,A\,b-17\,a^2\,A\,b^3+8\,A\,b^5-3\,a^5\,B+5\,a^3\,b^2\,B-2\,a\,b^4\,B\right)\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\right.\right.\right.$$
$$\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d\,x]\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\,\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d\,x])\,\mathrm{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\middle/\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)-$$

$$4 a\left(3 a^5 A-15 a^3 A b^2+8 a A b^4+6 a^4 b B-2 a^2 b^3 B\right)$$

$$\left(\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Bigg/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)-\left(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b},\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\middle/\left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right)+$$

$$2\left(3a^4 A b-15a^2 A b^3+8 A b^5+6a^3 b^2 B-2 a b^4 B\right)\left(\left(\mathrm{i}\,\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right.\right.$$

$$\left.\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\frac{\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\mathrm{Cos}[c+d x]}}\right],-\frac{2a}{-a-b}\right]\mathrm{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\mathrm{Cos}\left[\frac{1}{2}(c+d x)\right]^2\mathrm{Sec}[c+d x]}\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Sec}[c+d x]}{a+b}}\right)+$$

$$\frac{1}{b}2a\left(\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\mathrm{Csc}[c+d x]\,\mathrm{EllipticF}\Bigg[$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\right]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\Bigg)\Big/$$

$$\left((a+b)\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)-$$

$$\left(a\sqrt{\frac{(a+b)\,\mathrm{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\sqrt{-\frac{(a+b)\,\mathrm{Cos}[c+d x]\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.$$

$$\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\,\mathrm{Csc}[c+d x]\,\mathrm{EllipticPi}\Bigg[-\frac{a}{b},$$

$$\left.\mathrm{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\mathrm{Cos}[c+d x])\,\mathrm{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2a}{-a+b}\Bigg]\mathrm{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left.\left.\left(b\sqrt{\mathrm{Cos}[c+d x]}\sqrt{a+b\,\mathrm{Cos}[c+d x]}\right)+\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}\,\mathrm{Sin}[c+d x]}{b\sqrt{\mathrm{Cos}[c+d x]}}\right)\right)+$$

$$\frac{1}{d}\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\ \left(\frac{2\left(-A b^3 \text{Sin}[c+d x]+a b^2 B\,\text{Sin}[c+d x]\right)}{3 a^2\left(a^2-b^2\right)\left(a+b\,\text{Cos}[c+d x]\right)^2}+\left(2\left(-9 a^2 A b^3 \text{Sin}[c+d x]+5 A b^5 \text{Sin}[c+d x]+6 a^3 b^2 B\,\text{Sin}[c+d x]-2 a b^4 B\,\text{Sin}[c+d x]\right)\right)\Big/\left(3 a^3\left(a^2-b^2\right)^2\left(a+b\,\text{Cos}[c+d x]\right)\right)+\frac{2 A\,\text{Tan}[c+d x]}{a^3}\right)$$

Problem 436: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{5/2}\left(a+b\,\text{Cos}[c+d x]\right)^{5/2}}\,dx$$

Optimal (type 4, 567 leaves, 6 steps):

$$-\left(\left(2\left(8 a^4 A b-28 a^2 A b^3+16 A b^5-3 a^5 B+15 a^3 b^2 B-8 a b^4 B\right)\text{Cot}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(3 a^5\left(a-b\right)\left(a+b\right)^{3/2} d\right)\right)-\left(2\left(16 A b^4-a^4\left(A-3 B\right)+4 a b^3\left(3 A-2 B\right)-9 a^3 b\left(A-B\right)-2 a^2 b^2\left(8 A+3 B\right)\right)\text{Cot}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(3 a^4\sqrt{a+b}\left(a^2-b^2\right) d\right)+\frac{2 b\left(A b-a B\right)\text{Sin}[c+d x]}{3 a\left(a^2-b^2\right) d\,\text{Cos}[c+d x]^{3/2}\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}}+\frac{2 b\left(10 a^2 A b-6 A b^3-7 a^3 B+3 a b^2 B\right)\text{Sin}[c+d x]}{3 a^2\left(a^2-b^2\right)^2 d\,\text{Cos}[c+d x]^{3/2}\sqrt{a+b\,\text{Cos}[c+d x]}}+\left(2\left(a^4 A-13 a^2 A b^2+8 A b^4+8 a^3 b B-4 a b^3 B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]\right)\Big/\left(3 a^3\left(a^2-b^2\right)^2 d\,\text{Cos}[c+d x]^{3/2}\right)$$

Result (type 4, 1499 leaves):

$$\frac{1}{3\,a^4\,(a-b)^2\,(a+b)^2\,d}\Bigg(-\Bigg(\Bigg(\Bigg(4\,a\,\left(a^6\,A+15\,a^4\,A\,b^2-32\,a^2\,A\,b^4+16\,A\,b^6-9\,a^5\,b\,B+17\,a^3\,b^3\,B-8\,a\,b^5\,B\right)$$

$$\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-$$

$$4\,a\,\left(8\,a^5\,A\,b-28\,a^3\,A\,b^3+16\,a\,A\,b^5-3\,a^6\,B+15\,a^4\,b^2\,B-8\,a^2\,b^4\,B\right)$$

$$\Bigg(\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}\;\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\text{Csc}[c+d\,x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],-\frac{2\,a}{-a+b}\right]\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]^4\Bigg)\Bigg/$$

$$\left(\left(a+b\right)\sqrt{\text{Cos}[c+d\,x]}\;\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)-\Bigg(\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{-a+b}}$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d\,x]\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}\;\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Csc}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a}}$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b},\ \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2 a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \middle/ \left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\right) +$$

$$2\left(8 a^4 A b^2-28 a^2 A b^4+16 A b^6-3 a^5 b B+15 a^3 b^3 B-8 a b^5 B\right)$$

$$\left(\left(\mathbb{i}\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\sqrt{a+b\,\text{Cos}[c+d x]}\right.\right.$$

$$\left.\text{EllipticE}\left[\mathbb{i}\,\text{ArcSinh}\left[\frac{\text{Sin}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{\text{Cos}[c+d x]}}\right],\ -\frac{2 a}{-a-b}\right]\text{Sec}[c+d x]\right)\Big/$$

$$\left(b\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]}{a+b}}\right) +$$

$$\frac{1}{b}2 a\left(\left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\ \sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\right.\right.$$

$$\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \text{Csc}[c+d x]$$

$$\left.\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2 a}{-a+b}\right]\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right)\Big/$$

$$\left((a+b)\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right) - \left(a\sqrt{\frac{(a+b)\,\text{Cot}\left[\frac{1}{2}(c+d x)\right]^2}{-a+b}}\right.$$

$$\sqrt{-\frac{(a+b)\,\text{Cos}[c+d x]\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}\ \sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}$$

$$\text{Csc}[c+d\,x]\ \text{EllipticPi}\left[-\frac{a}{b},\ \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\ \text{Csc}\left[\frac{1}{2}\ (c+d\,x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2\,a}{-a+b}\right]$$

$$\left.\left.\text{Sin}\left[\frac{1}{2}\ (c+d\,x)\right]^4\right)\Big/\left(b\ \sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\right)+$$

$$\left.\left.\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \ \text{Sin}[c+d\,x]}{b\ \sqrt{\text{Cos}[c+d\,x]}}\right)\right)+\frac{1}{d}\sqrt{\text{Cos}[c+d\,x]}\ \sqrt{a+b\,\text{Cos}[c+d\,x]}$$

$$\left(\frac{2\,\text{Sec}[c+d\,x]\ (-8\,A\,b\,\text{Sin}[c+d\,x]+3\,a\,B\,\text{Sin}[c+d\,x])}{3\,a^4}-\right.$$

$$\frac{2\ \left(-A\,b^4\,\text{Sin}[c+d\,x]+a\,b^3\,B\,\text{Sin}[c+d\,x]\right)}{3\,a^3\ \left(a^2-b^2\right)\ (a+b\,\text{Cos}[c+d\,x])^2}-$$

$$\left(2\ \left(-12\,a^2\,A\,b^4\,\text{Sin}[c+d\,x]+8\,A\,b^6\,\text{Sin}[c+d\,x]+9\,a^3\,b^3\,B\,\text{Sin}[c+d\,x]-5\,a\,b^5\,B\,\text{Sin}[c+d\,x]\right)\right)\Big/$$

$$\left(3\,a^4\ \left(a^2-b^2\right)^2\ (a+b\,\text{Cos}[c+d\,x])\right)+$$

$$\left.\frac{2\,A\,\text{Sec}[c+d\,x]\ \text{Tan}[c+d\,x]}{3\,a^3}\right)$$

Problem 437: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{Cos}[c+d\,x]^{3/2}\ (a\,B+b\,B\,\text{Cos}[c+d\,x])}{(a+b\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 4, 419 leaves, 9 steps):

$$-\frac{1}{a\,b\,d}(a-b)\sqrt{a+b}\;B\,\mathrm{Cot}[c+d\,x]\;\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{b\,d}$$

$$\sqrt{a+b}\;B\,\mathrm{Cot}[c+d\,x]\;\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+\frac{1}{b^2\,d}$$

$$a\sqrt{a+b}\;B\,\mathrm{Cot}[c+d\,x]\;\mathrm{EllipticPi}\Big[\frac{a+b}{b},\mathrm{ArcSin}\Big[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\mathrm{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]$$

$$\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}+$$

$$\frac{a\,B\,\mathrm{Sin}[c+d\,x]}{b\,d\sqrt{\mathrm{Cos}[c+d\,x]}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}+\frac{B\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{d\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 4, 480 leaves):

$$\frac{1}{2\,b\sqrt{\frac{a-b}{a+b}}\;d\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}$$

$$B\sqrt{\mathrm{Cos}[c+d\,x]}\;\Bigg(2\,\mathrm{i}\,(a-b)\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticE}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],-\frac{a+b}{a-b}\Big]-4\,\mathrm{i}\,a\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticF}\Big[\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],-\frac{a+b}{a-b}\Big]+4\,\mathrm{i}\,a\sqrt{\frac{a+b\,\mathrm{Cos}[c+d\,x]}{(a+b)\,(1+\mathrm{Cos}[c+d\,x])}}$$

$$\mathrm{EllipticPi}\Big[\frac{a+b}{a-b},\mathrm{i}\,\mathrm{ArcSinh}\Big[\sqrt{\frac{a-b}{a+b}}\;\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Big],-\frac{a+b}{a-b}\Big]+$$

$$b\sqrt{\frac{a-b}{a+b}}\;\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]\;\mathrm{Sin}\Big[\frac{3}{2}(c+d\,x)\Big]+2\,a\sqrt{\frac{a-b}{a+b}}$$

$$\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]-b\sqrt{\frac{a-b}{a+b}}\;\sqrt{\frac{\mathrm{Cos}[c+d\,x]}{1+\mathrm{Cos}[c+d\,x]}}\;\mathrm{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Bigg)$$

Problem 440: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{a B + b B \operatorname{Cos}[c + d x]}{\operatorname{Cos}[c + d x]^{3/2} \left(a + b \operatorname{Cos}[c + d x]\right)^{3/2}} \, dx$$

Optimal (type 4, 226 leaves, 4 steps):

$$\frac{1}{a^2 d} 2 (a-b) \sqrt{a+b}\, B \operatorname{Cot}[c+d x] \operatorname{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}} - \frac{1}{a d} 2 \sqrt{a+b}\, B \operatorname{Cot}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a (1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\operatorname{Sec}[c+d x])}{a-b}}$$

Result (type 4, 896 leaves):

$$B \left(\frac{1}{d} 4 a \left(\left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \operatorname{Csc}[c+d x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}}{\sqrt{2}}\right], -\frac{2 a}{-a+b}\right] \operatorname{Sin}\left[\frac{1}{2} (c+d x)\right]^4\right) \Big/ \left((a+b) \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+b \operatorname{Cos}[c+d x]}\right) - \left(\sqrt{\frac{(a+b) \operatorname{Cot}\left[\frac{1}{2} (c+d x)\right]^2}{-a+b}} \sqrt{-\frac{(a+b) \operatorname{Cos}[c+d x] \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}} \sqrt{\frac{(a+b \operatorname{Cos}[c+d x]) \operatorname{Csc}\left[\frac{1}{2} (c+d x)\right]^2}{a}}\right.\right.\right.$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[-\frac{a}{b},\ \text{ArcSin}\left[\frac{\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Csc}\left[\frac{1}{2}(c+d x)\right]^2}{a}}}{\sqrt{2}}\right],\ -\frac{2 a}{-a+b}\right]$$

$$\left.\text{Sin}\left[\frac{1}{2}(c+d x)\right]^4\right) \Big/ \left(b\sqrt{\text{Cos}[c+d x]}\ \sqrt{a+b\,\text{Cos}[c+d x]}\right)\Bigg) +$$

$$\frac{2\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{a d\sqrt{\text{Cos}[c+d x]}} - \frac{1}{a\sqrt{\frac{a-b}{a+b}}\ d\sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\ \sqrt{a+b\,\text{Cos}[c+d x]}}$$

$$\sqrt{\text{Cos}[c+d x]}$$

$$\Bigg(2\,i\,(a-b)\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}$$

$$\text{EllipticE}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ -\frac{a+b}{a-b}\right] - 4\,i\,a$$

$$\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\ \text{EllipticF}\left[i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ -\frac{a+b}{a-b}\right] +$$

$$4\,i\,a\sqrt{\frac{a+b\,\text{Cos}[c+d x]}{(a+b)\,(1+\text{Cos}[c+d x])}}\ \text{EllipticPi}\left[\frac{a+b}{a-b},\ i\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\right.$$

$$\left.-\frac{a+b}{a-b}\right] + b\sqrt{\frac{a-b}{a+b}}\ \sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\ \text{Sec}\left[\frac{1}{2}(c+d x)\right]\text{Sin}\left[\frac{3}{2}(c+d x)\right] +$$

$$2 a\sqrt{\frac{a-b}{a+b}}\ \sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right] -$$

$$b\sqrt{\frac{a-b}{a+b}}\ \sqrt{\frac{\text{Cos}[c+d x]}{1+\text{Cos}[c+d x]}}\ \text{Tan}\left[\frac{1}{2}(c+d x)\right]\Bigg)\Bigg)$$

Problem 441: Unable to integrate problem.

$$\int \frac{1+\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{3/2}\sqrt{2+3\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 72 leaves, 1 step):

$$-\frac{1}{d}\text{Cot}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{2+3\,\text{Cos}[c+d x]}}{\sqrt{5}\ \sqrt{\text{Cos}[c+d x]}}\right],5\right]\sqrt{-1-\text{Sec}[c+d x]}\ \sqrt{1-\text{Sec}[c+d x]}$$

Result (type 8, 35 leaves):

$$\int \frac{1+\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{3/2}\sqrt{2+3\,\text{Cos}[c+d x]}}\,dx$$

Problem 442: Attempted integration timed out after 120 seconds.

$$\int \frac{1+\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{3/2}\sqrt{-2+3\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 70 leaves, 1 step):

$$-\frac{1}{d}\sqrt{5}\ \text{Cot}[c+d x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{-2+3\,\text{Cos}[c+d x]}}{\sqrt{\text{Cos}[c+d x]}}\right],\frac{1}{5}\right]\sqrt{-1+\text{Sec}[c+d x]}\ \sqrt{1+\text{Sec}[c+d x]}$$

Result (type 1, 1 leaves):

???

Problem 443: Attempted integration timed out after 120 seconds.

$$\int \frac{1+\text{Cos}[c+d x]}{\sqrt{2-3\,\text{Cos}[c+d x]}\ \text{Cos}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 93 leaves, 2 steps):

$$\frac{1}{d}\sqrt{5}\ \sqrt{-\text{Cos}[c+d x]}\ \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{2-3\,\text{Cos}[c+d x]}}{\sqrt{-\text{Cos}[c+d x]}}\right],\frac{1}{5}\right]\sqrt{-1+\text{Sec}[c+d x]}\ \sqrt{1+\text{Sec}[c+d x]}$$

Result (type 1, 1 leaves):

???

Problem 444: Unable to integrate problem.

$$\int \frac{1+\text{Cos}[c+d x]}{\sqrt{-2-3\,\text{Cos}[c+d x]}\ \text{Cos}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 95 leaves, 2 steps):

$$\frac{1}{d}\sqrt{-\text{Cos}[c+d x]}\ \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]$$
$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{-2-3\,\text{Cos}[c+d x]}}{\sqrt{5}\ \sqrt{-\text{Cos}[c+d x]}}\right],5\right]\sqrt{-1-\text{Sec}[c+d x]}\ \sqrt{1-\text{Sec}[c+d x]}$$

Result (type 8, 35 leaves):

$$\int \frac{1+\text{Cos}[c+d x]}{\sqrt{-2-3\,\text{Cos}[c+d x]}\ \text{Cos}[c+d x]^{3/2}}\,dx$$

Problem 445: Unable to integrate problem.

$$\int \frac{1+\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{3/2}\sqrt{3+2\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 72 leaves, 1 step):

$$\frac{1}{3 d}2\,\text{Cot}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{3+2\,\text{Cos}[c+d x]}}{\sqrt{5}\ \sqrt{\text{Cos}[c+d x]}}\right],-5\right]\sqrt{1-\text{Sec}[c+d x]}\ \sqrt{1+\text{Sec}[c+d x]}$$

Result (type 8, 35 leaves):

$$\int \frac{1+\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{3/2}\sqrt{3+2\,\text{Cos}[c+d x]}}\,dx$$

Problem 446: Unable to integrate problem.

$$\int \frac{1+\text{Cos}[c+d x]}{\sqrt{3-2\,\text{Cos}[c+d x]}\ \text{Cos}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 74 leaves, 1 step):

$$\frac{1}{3 d}2\sqrt{5}\ \text{Cot}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{3-2\,\text{Cos}[c+d x]}}{\sqrt{\text{Cos}[c+d x]}}\right],-\frac{1}{5}\right]$$
$$\sqrt{1-\text{Sec}[c+d x]}\ \sqrt{1+\text{Sec}[c+d x]}$$

Result (type 8, 35 leaves):

$$\int \frac{1+\text{Cos}[c+d x]}{\sqrt{3-2\,\text{Cos}[c+d x]}\ \text{Cos}[c+d x]^{3/2}}\,dx$$

Problem 447: Attempted integration timed out after 120 seconds.

$$\int \frac{1+\text{Cos}[c+d x]}{\text{Cos}[c+d x]^{3/2}\sqrt{-3+2\,\text{Cos}[c+d x]}}\,dx$$

Optimal (type 4, 98 leaves, 2 steps):

$$-\frac{1}{3 d}2 \sqrt{5} \sqrt{-\mathrm{Cos}[c+d x]} \sqrt{\mathrm{Cos}[c+d x]} \mathrm{Csc}[c+d x]$$
$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-3+2 \mathrm{Cos}[c+d x]}}{\sqrt{-\mathrm{Cos}[c+d x]}}\right],-\frac{1}{5}\right] \sqrt{1-\mathrm{Sec}[c+d x]} \sqrt{1+\mathrm{Sec}[c+d x]}$$

Result (type 1, 1 leaves):

???

Problem 448: Unable to integrate problem.

$$\int \frac{1+\mathrm{Cos}[c+d x]}{\sqrt{-3-2 \mathrm{Cos}[c+d x]} \mathrm{Cos}[c+d x]^{3/2}} \, dx$$

Optimal (type 4, 96 leaves, 2 steps):

$$-\frac{1}{3 d}2 \sqrt{-\mathrm{Cos}[c+d x]} \sqrt{\mathrm{Cos}[c+d x]} \mathrm{Csc}[c+d x]$$
$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{-3-2 \mathrm{Cos}[c+d x]}}{\sqrt{5} \sqrt{-\mathrm{Cos}[c+d x]}}\right],-5\right] \sqrt{1-\mathrm{Sec}[c+d x]} \sqrt{1+\mathrm{Sec}[c+d x]}$$

Result (type 8, 35 leaves):

$$\int \frac{1+\mathrm{Cos}[c+d x]}{\sqrt{-3-2 \mathrm{Cos}[c+d x]} \mathrm{Cos}[c+d x]^{3/2}} \, dx$$

Problem 451: Result more than twice size of optimal antiderivative.

$$\int (c \mathrm{Cos}[e+f x])^m (a+b \mathrm{Cos}[e+f x])^3 (A+B \mathrm{Cos}[e+f x]) \, dx$$

Optimal (type 5, 406 leaves, 6 steps):

$$\left(b \left(b^2 B (3+m)+3 a A b (4+m)+2 a^2 B (5+m)\right) (c \mathrm{Cos}[e+f x])^{1+m} \mathrm{Sin}[e+f x]\right) \Big/$$
$$(c f (2+m) (4+m))+\left(b^2 (A b (4+m)+a B (6+m)) \mathrm{Cos}[e+f x] (c \mathrm{Cos}[e+f x])^{1+m} \mathrm{Sin}[e+f x]\right) \Big/$$
$$(c f (3+m) (4+m))+\frac{b B (c \mathrm{Cos}[e+f x])^{1+m} (a+b \mathrm{Cos}[e+f x])^2 \mathrm{Sin}[e+f x]}{c f (4+m)}-$$
$$\left(\left(a^2 (2+m) (b B (1+m)+a A (4+m))+b (1+m) \left(b^2 B (3+m)+3 a A b (4+m)+2 a^2 B (5+m)\right)\right)\right.$$
$$\left.(c \mathrm{Cos}[e+f x])^{1+m} \mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{1+m}{2},\frac{3+m}{2},\mathrm{Cos}[e+f x]^2\right] \mathrm{Sin}[e+f x]\right) \Big/$$
$$\left(c f (1+m) (2+m) (4+m) \sqrt{\mathrm{Sin}[e+f x]^2}\right)-$$
$$\left(\left(A b^3 (2+m)+3 a b^2 B (2+m)+3 a^2 A b (3+m)+a^3 B (3+m)\right) (c \mathrm{Cos}[e+f x])^{2+m}\right.$$
$$\left.\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{2+m}{2},\frac{4+m}{2},\mathrm{Cos}[e+f x]^2\right] \mathrm{Sin}[e+f x]\right) \Big/$$
$$\left(c^2 f (2+m) (3+m) \sqrt{\mathrm{Sin}[e+f x]^2}\right)$$

Result (type 5, 967 leaves) :

$$\left(\left(c\,\mathrm{Cos}[e+f x]\right)^m \left(a+b\,\mathrm{Cos}[e+f x]\right)^3 \left(A+B\,\mathrm{Cos}[e+f x]\right) \mathrm{Sec}[e+f x]^4\right.$$
$$\left(\mathrm{Sec}[e+f x]^2\right)^{\frac{1+m}{2}} \left(a^3 A\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, 3+\frac{m}{2}, \frac{3}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x] + \right.$$
$$3 a A b^2\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, 3+\frac{m}{2}, \frac{3}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x] +$$
$$3 a^2 b B\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, 3+\frac{m}{2}, \frac{3}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x] +$$
$$b^3 B\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, 3+\frac{m}{2}, \frac{3}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x] +$$
$$3 a^2 A b\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{7}{2}+\frac{m}{2}, \frac{3}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x] +$$
$$A b^3\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{7}{2}+\frac{m}{2}, \frac{3}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x] +$$
$$a^3 B\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{7}{2}+\frac{m}{2}, \frac{3}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x] +$$
$$3 a b^2 B\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2}, \frac{7}{2}+\frac{m}{2}, \frac{3}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x] +$$
$$\frac{2}{3} a^3 A\,\mathrm{Hypergeometric2F1}\left[\frac{3}{2}, 3+\frac{m}{2}, \frac{5}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^3 +$$
$$a A b^2\,\mathrm{Hypergeometric2F1}\left[\frac{3}{2}, 3+\frac{m}{2}, \frac{5}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^3 +$$
$$a^2 b B\,\mathrm{Hypergeometric2F1}\left[\frac{3}{2}, 3+\frac{m}{2}, \frac{5}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^3 +$$
$$2 a^2 A b\,\mathrm{Hypergeometric2F1}\left[\frac{3}{2}, \frac{7}{2}+\frac{m}{2}, \frac{5}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^3 +$$
$$\frac{1}{3} A b^3\,\mathrm{Hypergeometric2F1}\left[\frac{3}{2}, \frac{7}{2}+\frac{m}{2}, \frac{5}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^3 +$$
$$\frac{2}{3} a^3 B\,\mathrm{Hypergeometric2F1}\left[\frac{3}{2}, \frac{7}{2}+\frac{m}{2}, \frac{5}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^3 +$$
$$a b^2 B\,\mathrm{Hypergeometric2F1}\left[\frac{3}{2}, \frac{7}{2}+\frac{m}{2}, \frac{5}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^3 +$$
$$\frac{1}{5} a^3 A\,\mathrm{Hypergeometric2F1}\left[\frac{5}{2}, 3+\frac{m}{2}, \frac{7}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^5 +$$
$$\frac{3}{5} a^2 A b\,\mathrm{Hypergeometric2F1}\left[\frac{5}{2}, \frac{7}{2}+\frac{m}{2}, \frac{7}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^5 +$$
$$\left.\left.\frac{1}{5} a^3 B\,\mathrm{Hypergeometric2F1}\left[\frac{5}{2}, \frac{7}{2}+\frac{m}{2}, \frac{7}{2}, -\mathrm{Tan}[e+f x]^2\right] \mathrm{Tan}[e+f x]^5\right)\right) \Big/$$
$$\left(f \left(a^3 \left(B+A\sqrt{\mathrm{Sec}[e+f x]^2}\right) + 3 a b^2 \left(B+A\sqrt{\mathrm{Sec}[e+f x]^2}\right) + 3 a^2 b \left(A+B\sqrt{\mathrm{Sec}[e+f x]^2}\right) + \right.\right.$$
$$b^3 \left(A+B\sqrt{\mathrm{Sec}[e+f x]^2}\right) + \left(A b^3 + 2 a^3 \left(B+A\sqrt{\mathrm{Sec}[e+f x]^2}\right) + \right.$$
$$\left. 3 a b^2 \left(B+A\sqrt{\mathrm{Sec}[e+f x]^2}\right) + 3 a^2 b \left(2 A+B\sqrt{\mathrm{Sec}[e+f x]^2}\right)\right)$$
$$\left.\left.\mathrm{Tan}[e+f x]^2 + a^2 \left(3 A b + a B + a A\sqrt{\mathrm{Sec}[e+f x]^2}\right) \mathrm{Tan}[e+f x]^4\right)\right)$$

Problem 454: Result more than twice size of optimal antiderivative.

$$\int \frac{(c \operatorname{Cos}[e+f x])^m (A+B \operatorname{Cos}[e+f x])}{a+b \operatorname{Cos}[e+f x]} \, dx$$

Optimal (type 6, 286 leaves, 7 steps):

$$\frac{1}{b\left(a^2-b^2\right) f} a (A b-a B) c \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1-m}{2}, 1, \frac{3}{2}, \operatorname{Sin}[e+f x]^2,-\frac{b^2 \operatorname{Sin}[e+f x]^2}{a^2-b^2}\right] (c \operatorname{Cos}[e+f x])^{-1+m}\left(\operatorname{Cos}[e+f x]^2\right)^{\frac{1-m}{2}} \operatorname{Sin}[e+f x]-\frac{1}{\left(a^2-b^2\right) f} (A b-a B) \operatorname{AppellF1}\left[\frac{1}{2},-\frac{m}{2}, 1, \frac{3}{2}, \operatorname{Sin}[e+f x]^2,-\frac{b^2 \operatorname{Sin}[e+f x]^2}{a^2-b^2}\right] (c \operatorname{Cos}[e+f x])^m\left(\operatorname{Cos}[e+f x]^2\right)^{-m/2} \operatorname{Sin}[e+f x]-\left(B (c \operatorname{Cos}[e+f x])^{1+m} \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3+m}{2}, \operatorname{Cos}[e+f x]^2\right] \operatorname{Sin}[e+f x]\right) \Big/ \left(b c f (1+m) \sqrt{\operatorname{Sin}[e+f x]^2}\right)$$

Result (type 6, 10 482 leaves):

$$\left(\operatorname{Cos}[e+f x]^{-1-m} (c \operatorname{Cos}[e+f x])^m\left(\frac{A \operatorname{Cos}[e+f x]^m}{a+b \operatorname{Cos}[e+f x]}+\frac{B \operatorname{Cos}[e+f x]^{1+m}}{a+b \operatorname{Cos}[e+f x]}\right)\right.$$
$$\operatorname{Sin}[e+f x]\left(\frac{B \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, 1+\frac{m}{2}, \frac{3}{2},-\operatorname{Tan}[e+f x]^2\right]}{b}+\right.$$
$$\frac{A \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2},-\operatorname{Tan}[e+f x]^2\right]}{b}-$$
$$\frac{a B \operatorname{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2},-\operatorname{Tan}[e+f x]^2\right]}{b^2}+\left(3 a^2 A\left(a^2-b^2\right)\right.$$
$$\left.\operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2},-\operatorname{Tan}[e+f x]^2, \frac{a^2 \operatorname{Tan}[e+f x]^2}{-a^2+b^2}\right]\left(1+\operatorname{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right) \Big/$$
$$\left(b\left(-3\left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2},-\operatorname{Tan}[e+f x]^2,-\frac{a^2 \operatorname{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2 a^2 \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2},-\operatorname{Tan}[e+f x]^2,-\frac{a^2 \operatorname{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)(-1+m) \operatorname{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2},-\operatorname{Tan}[e+f x]^2,-\frac{a^2 \operatorname{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\operatorname{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\operatorname{Tan}[e+f x]^2\right)\right)\right)-\left(3 a^3\left(a^2-b^2\right) B\right.$$
$$\left.\operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2},-\operatorname{Tan}[e+f x]^2, \frac{a^2 \operatorname{Tan}[e+f x]^2}{-a^2+b^2}\right]\left(1+\operatorname{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right) \Big/$$
$$\left(b^2\left(-3\left(a^2-b^2\right) \operatorname{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2},-\operatorname{Tan}[e+f x]^2,-\frac{a^2 \operatorname{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right)(-1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$

$$\text{Tan}[e+f x]^2\Big) \left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big) -$$

$$\left(3 a A \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\right) \Big/$$

$$\left(\left(-3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m \right.\right.\right.$$

$$\left.\left. \text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big) + \left(3 a^2 \left(a^2-b^2\right) B \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, \right.\right.$$

$$\left.\left. -\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right] \left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\right) \Big/$$

$$\left(b\left(-3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\right.\right.$$

$$\left.\left.\left.\text{Tan}[e+f x]^2\right) \left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\right)\right)\right) \Big/$$

$$\left(f\left(\text{Sec}[e+f x]^2\left(\frac{B \text{Hypergeometric2F1}\left[\frac{1}{2}, 1+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[e+f x]^2\right]}{b} + \right.\right.\right.$$

$$\frac{A \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2}, -\text{Tan}[e+f x]^2\right]}{b} -$$

$$\frac{a B \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2}, -\text{Tan}[e+f x]^2\right]}{b^2} + \left(3 a^2 A \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \right.\right.$$

$$\left.\left.\frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right] \left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right) \Big/$$

$$\left(b\left(-3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \right.$$

$$\left(a^2-b^2\right)\,(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Big)$$

$$\text{Tan}[e+f x]^2\Big)\,\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big)-\Big(3\,a^3\left(a^2-b^2\right)B\,\text{AppellF1}\Big[\frac{1}{2},$$

$$\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\Big]\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Big)\Big/$$

$$\Big(b^2\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Big(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Big)$$

$$\text{Tan}[e+f x]^2\Big)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big)-\Big(3\,a\,A\left(a^2-b^2\right)$$

$$\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\Big)\Big/$$

$$\Big(\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Big(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m$$

$$\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Big)\,\text{Tan}[e+f x]^2\Big)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big)+\Big(3\,a^2\left(a^2-b^2\right)B\,\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},$$

$$-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\Big]\left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\Big)\Big/$$

$$\Big(b\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Big(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Big)$$

$$\text{Tan}[e+f x]^2\Big)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big)\Big)+\text{Tan}[e+f x]$$

$$\Big(-\Big(\Big(6\,a^4\,A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Big)\Big/$$

$$\Big(b\Big(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Big(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,\right.$$

$$\left.\left.\left.\left.-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\right)\right)+$$

$$\left(6\,a^5\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b^2\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1+m\right),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\right)+$$

$$\left(6\,a^3\,A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right.$$

$$\left.\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\right)\Big/$$

$$\left(\left(\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(a^2-b^2\right)m\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)$$

$$\left.\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\right)-\left(6\,a^4\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},\right.\right.$$

$$\left.\left.-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\right)\Big/$$

$$\left(b\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.$$

$$\left.\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\right)+$$

$$\left(6\,a^2\,A\left(a^2-b^2\right)\left(\frac{1}{2}-\frac{m}{2}\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1+m\right),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\right.\right.$$

$$\left.\left.\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right)\Big/$$

$$\left(b\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[e+fx]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+fx]^2\right)\right)\right)-$$
$$\left(6a^3\left(a^2-b^2\right)B\left(\frac{1}{2}-\frac{m}{2}\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+fx]^2,\right.\right.$$
$$\left.\left.\frac{a^2\,\text{Tan}[e+fx]^2}{-a^2+b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]\left(1+\text{Tan}[e+fx]^2\right)^{-\frac{1}{2}-\frac{m}{2}}\right)\Big/$$
$$\left(b^2\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[e+fx]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+fx]^2\right)\right)\right)+$$
$$\left(3a^2A\left(a^2-b^2\right)\left(-\frac{1}{3}(-1+m)\,\text{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}(-1+m),1,\frac{5}{2},-\text{Tan}[e+fx]^2,\right.\right.\right.$$
$$\left.\frac{a^2\,\text{Tan}[e+fx]^2}{-a^2+b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]+\frac{1}{3\left(-a^2+b^2\right)}$$
$$2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[e+fx]^2,\frac{a^2\,\text{Tan}[e+fx]^2}{-a^2+b^2}\right]$$
$$\left.\left.\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]\right)\left(1+\text{Tan}[e+fx]^2\right)^{\frac{1}{2}-\frac{m}{2}}\right)\Big/$$
$$\left(b\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]+\right.\right.$$
$$\left(2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]+\right.$$
$$\left.\left(a^2-b^2\right)(-1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\text{Tan}[e+fx]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+fx]^2\right)\right)\right)-$$
$$\left(3a^3\left(a^2-b^2\right)B\left(-\frac{1}{3}(-1+m)\,\text{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}(-1+m),1,\frac{5}{2},-\text{Tan}[e+fx]^2,\right.\right.\right.$$
$$\left.\frac{a^2\,\text{Tan}[e+fx]^2}{-a^2+b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]+\frac{1}{3\left(-a^2+b^2\right)}$$
$$2a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[e+fx]^2,\frac{a^2\,\text{Tan}[e+fx]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Big)\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(b^2\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2a^2\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)(-1+m)\text{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[e+f x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Bigg)+$$

$$\Bigg(3 a A\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[e+f x]^2\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{-1-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2a^2\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[e+f x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Bigg)-$$

$$\Bigg(3a^2\left(a^2-b^2\right)B\,m\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\text{Tan}[e+f x]^2}{-a^2+b^2}\right]$$

$$\text{Sec}[e+f x]^2\text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{-1-\frac{m}{2}}\Bigg)\Bigg/$$

$$\Bigg(b\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\Bigg(2a^2\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)$$

$$\text{Tan}[e+f x]^2\Bigg)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Bigg)-$$

$$\Bigg(3 a A\left(a^2-b^2\right)\Bigg(-\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]$$

$$\text{Sec}[e+f x]^2\text{Tan}[e+f x]-\frac{1}{3\left(a^2-b^2\right)}2a^2\text{AppellF1}\left[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\right.$$

$$\left.-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\text{Tan}[e+f x]\Bigg)\left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\Bigg)\Bigg/$$

$$\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[e+f x]^2\right) \left(-b^2+a^2 \left(1+\text{Tan}[e+f x]^2\right)\right)\right) +$$

$$\left(3 a^2 \left(a^2-b^2\right) B \left(-\frac{1}{3} m \text{AppellF1}\left[\frac{3}{2}, 1+\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right]\right.\right.$$

$$\text{Sec}[e+f x]^2 \text{Tan}[e+f x] + \frac{1}{3\left(-a^2+b^2\right)} 2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2,\right.$$

$$\left.\left.\left.\frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\right) \left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\right) \Big/$$

$$\left(b \left(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] +\right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \left(a^2-b^2\right) m\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2}, \frac{2+m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right)$$

$$\left.\left(-b^2+a^2 \left(1+\text{Tan}[e+f x]^2\right)\right)\right) + \frac{1}{b} A \text{Csc}[e+f x] \text{Sec}[e+f x]$$

$$\left(-\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2}, -\text{Tan}[e+f x]^2\right] + \left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}(-1-m)}\right) -$$

$$\frac{1}{b^2} a B \text{Csc}[e+f x] \text{Sec}[e+f x] \left(-\text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1+m}{2}, \frac{3}{2}, -\text{Tan}[e+f x]^2\right] +\right.$$

$$\left.\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}(-1-m)}\right) + \frac{1}{b} B \text{Csc}[e+f x] \text{Sec}[e+f x]$$

$$\left(-\text{Hypergeometric2F1}\left[\frac{1}{2}, 1+\frac{m}{2}, \frac{3}{2}, -\text{Tan}[e+f x]^2\right] + \left(1+\text{Tan}[e+f x]^2\right)^{-1-\frac{m}{2}}\right) -$$

$$\left(3 a^2 A \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1+m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right]\right.$$

$$\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}$$

$$\left(2 \left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] +\right.\right.$$

$$\left.\left(a^2-b^2\right) (-1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1+m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$

$$\text{Sec}[e+f x]^2 \text{Tan}[e+f x] - 3 \left(a^2-b^2\right) \left(-\frac{1}{3} (-1+m) \text{AppellF1}\left[\frac{3}{2}, 1+\frac{1}{2}(-1+m), 1,\right.\right.$$

$$\left.\frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x] - \frac{1}{3\left(a^2-b^2\right)}$$

$$2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1+m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]$$

$$\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]\Big)+\mathrm{Tan}[e+f x]^2\Bigg(2 a^2\left(-\frac{3}{5}(-1+m)\,\mathrm{AppellF1}\left[\frac{5}{2},\right.\right.$$

$$1+\frac{1}{2}(-1+m),2,\frac{7}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[$$

$$e+f x]-\frac{1}{5\left(a^2-b^2\right)}12 a^2\,\mathrm{AppellF1}\left[\frac{5}{2},\frac{1}{2}(-1+m),3,\frac{7}{2},-\mathrm{Tan}[e+f x]^2,\right.$$

$$-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]\Bigg)+\left(a^2-b^2\right)(-1+m)$$

$$\left(-\frac{1}{5\left(a^2-b^2\right)}6 a^2\,\mathrm{AppellF1}\left[\frac{5}{2},\frac{1+m}{2},2,\frac{7}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\right]\right.$$

$$\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]-\frac{3}{5}(1+m)\,\mathrm{AppellF1}\left[\frac{5}{2},1+\frac{1+m}{2},1,\frac{7}{2},\right.$$

$$-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Bigg(b\Bigg(-3\left(a^2-b^2\right)\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(2 a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.$$

$$\left(a^2-b^2\right)(-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\mathrm{Tan}[e+f x]^2,\right.$$

$$\left.\left.-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\mathrm{Tan}[e+f x]^2\Big)^2\left(-b^2+a^2\left(1+\mathrm{Tan}[e+f x]^2\right)\right)\Bigg)+$$

$$\Bigg(3 a^3\left(a^2-b^2\right)B\,\mathrm{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1+m),1,\frac{3}{2},-\mathrm{Tan}[e+f x]^2,\frac{a^2\,\mathrm{Tan}[e+f x]^2}{-a^2+b^2}\right]$$

$$\left(1+\mathrm{Tan}[e+f x]^2\right)^{\frac{1}{2}-\frac{m}{2}}$$

$$\Bigg(2\Bigg(2 a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left.\left(a^2-b^2\right)(-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1+m}{2},1,\frac{5}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$

$$\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]-3\left(a^2-b^2\right)\left(-\frac{1}{3}(-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}(-1+m),1,\right.\right.$$

$$\frac{5}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]-\frac{1}{3\left(a^2-b^2\right)}$$

$$2 a^2\,\mathrm{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1+m),2,\frac{5}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\right]$$

$$\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[e+f x]\Big)+\mathrm{Tan}[e+f x]^2\Bigg(2 a^2\left(-\frac{3}{5}(-1+m)\,\mathrm{AppellF1}\left[\frac{5}{2},\right.\right.$$

$$1+\frac{1}{2}(-1+m),2,\frac{7}{2},-\mathrm{Tan}[e+f x]^2,-\frac{a^2\,\mathrm{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f x]^2\,\mathrm{Tan}[$$

$$e+f x]-\frac{1}{5\left(a^2-b^2\right)}12 a^2\,\mathrm{AppellF1}\left[\frac{5}{2},\frac{1}{2}(-1+m),3,\frac{7}{2},-\mathrm{Tan}[e+f x]^2,\right.$$

$$-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]\Bigg)+\left(a^2-b^2\right)\,(-1+m)$$

$$\left(-\frac{1}{5\left(a^2-b^2\right)}6\,a^2\,\mathrm{AppellF1}\Big[\frac{5}{2},\,\frac{1+m}{2},\,2,\,\frac{7}{2},\,-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\right.$$

$$\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]-\frac{3}{5}\,(1+m)\,\mathrm{AppellF1}\Big[\frac{5}{2},\,1+\frac{1+m}{2},\,1,\,\frac{7}{2},$$

$$\left.-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(b^2\,\left(-3\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,\frac{1}{2}\,(-1+m),\,1,\,\frac{3}{2},\,-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]+\right.\right.$$

$$\left(2\,a^2\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{1}{2}\,(-1+m),\,2,\,\frac{5}{2},\,-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]+\right.$$

$$\left(a^2-b^2\right)\,(-1+m)\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{1+m}{2},\,1,\,\frac{5}{2},\,-\mathrm{Tan}[e+f\,x]^2,$$

$$\left.\left.-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\right)\,\mathrm{Tan}[e+f\,x]^2\right)^2\,\left(-b^2+a^2\,\left(1+\mathrm{Tan}[e+f\,x]^2\right)\right)\Bigg)+$$

$$\left(3\,a\,A\,\left(a^2-b^2\right)\,\mathrm{AppellF1}\Big[\frac{1}{2},\,\frac{m}{2},\,1,\,\frac{3}{2},\,-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\right.$$

$$\left(1+\mathrm{Tan}[e+f\,x]^2\right)^{-m/2}\,\left(2\,\left(2\,a^2\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},\,-\mathrm{Tan}[e+f\,x]^2,\right.\right.$$

$$-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]+\left(a^2-b^2\right)\,m\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{2+m}{2},\,1,\,\frac{5}{2},$$

$$\left.-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\right)\,\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]-$$

$$3\,\left(a^2-b^2\right)\,\left(-\frac{1}{3}\,m\,\mathrm{AppellF1}\Big[\frac{3}{2},\,1+\frac{m}{2},\,1,\,\frac{5}{2},\,-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\right.$$

$$\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]-\frac{1}{3\left(a^2-b^2\right)}2\,a^2\,\mathrm{AppellF1}\Big[\frac{3}{2},\,\frac{m}{2},\,2,\,\frac{5}{2},$$

$$\left.-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]\right)+\mathrm{Tan}[e+f\,x]^2$$

$$\left(2\,a^2\,\left(-\frac{3}{5}\,m\,\mathrm{AppellF1}\Big[\frac{5}{2},\,1+\frac{m}{2},\,2,\,\frac{7}{2},\,-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\right.\right.$$

$$\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]-\frac{1}{5\left(a^2-b^2\right)}12\,a^2\,\mathrm{AppellF1}\Big[\frac{5}{2},\,\frac{m}{2},\,3,\,\frac{7}{2},$$

$$\left.-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\,\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]\right)+\left(a^2-b^2\right)\,m$$

$$\left(-\frac{1}{5\left(a^2-b^2\right)}6\,a^2\,\mathrm{AppellF1}\Big[\frac{5}{2},\,\frac{2+m}{2},\,2,\,\frac{7}{2},\,-\mathrm{Tan}[e+f\,x]^2,\,-\frac{a^2\,\mathrm{Tan}[e+f\,x]^2}{a^2-b^2}\Big]\right.$$

$$\mathrm{Sec}[e+f\,x]^2\,\mathrm{Tan}[e+f\,x]-\frac{3}{5}\,(2+m)\,\mathrm{AppellF1}\Big[\frac{5}{2},\,1+\frac{2+m}{2},\,1,\,\frac{7}{2},$$

$$-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Big)\Big)\Big)\Big)\Big)\Big/$$

$$\Bigg(\Bigg(\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]+$$

$$\Bigg(2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]+$$

$$\left(a^2-b^2\right) m\,\text{AppellF1}\Big[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]\Bigg)$$

$$\text{Tan}[e+f x]^2\Bigg)^2\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Bigg)-$$

$$\Bigg(3 a^2\left(a^2-b^2\right) B\,\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\Big]$$

$$\left(1+\text{Tan}[e+f x]^2\right)^{-m/2}\Bigg(2\Bigg(2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,$$

$$-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]+\left(a^2-b^2\right) m\,\text{AppellF1}\Big[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},$$

$$-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]\Bigg)\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-$$

$$3\left(a^2-b^2\right)\Bigg(-\frac{1}{3} m\,\text{AppellF1}\Big[\frac{3}{2},1+\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\frac{1}{3\left(a^2-b^2\right)}2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},$$

$$-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+\text{Tan}[e+f x]^2$$

$$\Bigg(2 a^2\Bigg(-\frac{3}{5} m\,\text{AppellF1}\Big[\frac{5}{2},1+\frac{m}{2},2,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\frac{1}{5\left(a^2-b^2\right)}12 a^2\,\text{AppellF1}\Big[\frac{5}{2},\frac{m}{2},3,\frac{7}{2},$$

$$-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)+\left(a^2-b^2\right) m$$

$$\Bigg(-\frac{1}{5\left(a^2-b^2\right)}6 a^2\,\text{AppellF1}\Big[\frac{5}{2},\frac{2+m}{2},2,\frac{7}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\frac{3}{5}(2+m)\,\text{AppellF1}\Big[\frac{5}{2},1+\frac{2+m}{2},1,\frac{7}{2},$$

$$-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]\,\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Bigg(b\Bigg(-3\left(a^2-b^2\right)\text{AppellF1}\Big[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]+$$

$$\Bigg(2 a^2\,\text{AppellF1}\Big[\frac{3}{2},\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]+$$

$$\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2},\frac{2+m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$
$$\left.\left.\left.\left.\text{Tan}[e+f x]^2\right)^2 \left(-b^2+a^2 \left(1+\text{Tan}[e+f x]^2\right)\right)\right)\right)\right)\right)$$

Problem 459: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (a+a \,\text{Cos}[c+d x]) \,(A+B \,\text{Cos}[c+d x]) \,\text{Sec}[c+d x]^{7/2} \, dx$$

Optimal (type 4, 172 leaves, 9 steps):

$$-\frac{1}{5 d}2 a (3 A+5 B) \sqrt{\text{Cos}[c+d x]} \,\text{EllipticE}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}+$$
$$\frac{2 a (A+B) \sqrt{\text{Cos}[c+d x]} \,\text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}+$$
$$\frac{2 a (3 A+5 B) \sqrt{\text{Sec}[c+d x]} \,\text{Sin}[c+d x]}{5 d}+$$
$$\frac{2 a (A+B) \,\text{Sec}[c+d x]^{3/2} \,\text{Sin}[c+d x]}{3 d}+\frac{2 a A \,\text{Sec}[c+d x]^{5/2} \,\text{Sin}[c+d x]}{5 d}$$

Result (type 5, 381 leaves):

$$\frac{1}{30 d} a \,(1+\text{Cos}[c+d x]) \,\text{Sec}\left[\frac{1}{2} (c+d x)\right]^2 \left(-9 \sqrt{2} A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \,\text{Csc}[c]\right.$$
$$\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)-$$
$$15 \sqrt{2} B e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \,\text{Csc}[c]$$
$$\left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i (c+d x)}\right]\right)+$$
$$10 A \sqrt{\text{Cos}[c+d x]} \,\text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}+$$
$$10 B \sqrt{\text{Cos}[c+d x]} \,\text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}+$$
$$\left.2 \sqrt{\text{Sec}[c+d x]} \,(3 (3 A+5 B) \,\text{Cos}[d x] \,\text{Csc}[c]+(5 (A+B)+3 A \,\text{Sec}[c+d x]) \,\text{Tan}[c+d x])\right)$$

Problem 460: Result unnecessarily involves higher level functions.

$$\int (a + a \operatorname{Cos}[c + d x]) (A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{5/2} \, dx$$

Optimal (type 4, 135 leaves, 8 steps):

$$-\frac{2 a (A + B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{d} + \frac{2 a (A + 3 B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{3 d} + \frac{2 a (A + B) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d} + \frac{2 a A \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{3 d}$$

Result (type 5, 227 leaves):

$$\left(a e^{-i (c+d x)} (1 + \operatorname{Cos}[c + d x]) \left((A + 3 B) e^{i (c+d x)} \left(1 + e^{2 i (c+d x)}\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] - i \left(-3 A - 3 B - A e^{i (c+d x)} - 3 A e^{2 i (c+d x)} - 3 B e^{2 i (c+d x)} + A e^{3 i (c+d x)} + 3 (A + B) \left(1 + e^{2 i (c+d x)}\right)^{3/2} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right)\right) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \sqrt{\operatorname{Sec}[c + d x]}\right) \Big/ \left(3 d \left(1 + e^{2 i (c+d x)}\right)\right)$$

Problem 461: Result unnecessarily involves higher level functions.

$$\int (a + a \operatorname{Cos}[c + d x]) (A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{3/2} \, dx$$

Optimal (type 4, 106 leaves, 7 steps):

$$-\frac{2 a (A - B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{d} + \frac{2 a (A + B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{d} + \frac{2 a A \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d}$$

Result (type 5, 124 leaves):

$$\frac{1}{d}2\,a\left((A+B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]-\frac{1}{2}\,i\,e^{-i\,(c+d\,x)}\left(-2\,A+B+B\,e^{2\,i\,(c+d\,x)}+2\,(A-B)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)\right)\sqrt{\text{Sec}[c+d\,x]}$$

Problem 462: Result unnecessarily involves higher level functions.

$$\int (a+a\,\text{Cos}[c+d\,x])\,(A+B\,\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 110 leaves, 7 steps):

$$\frac{2\,a\,(A+B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{2\,a\,(3\,A+B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a\,B\,\text{Sin}[c+d\,x]}{3\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 163 leaves):

$$\frac{1}{3\,d}a\,e^{-i\,(2\,c+d\,x)}\sqrt{\text{Sec}[c+d\,x]}\left(2\,(3\,A+B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]+6\,i\,(A+B)\,e^{-i\,(c+d\,x)}\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+2\,\text{Cos}[c+d\,x]\,(-3\,i\,(A+B)+B\,\text{Sin}[c+d\,x])\right)(\text{Cos}[2\,c+d\,x]+i\,\text{Sin}[2\,c+d\,x])$$

Problem 463: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\text{Cos}[c+d\,x])\,(A+B\,\text{Cos}[c+d\,x])}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 141 leaves, 8 steps):

$$\frac{2\,a\,(5\,A+3\,B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{5\,d}+\frac{2\,a\,(A+B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,d}+\frac{2\,a\,B\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{2\,a\,(A+B)\,\text{Sin}[c+d\,x]}{3\,d\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 5, 149 leaves):

$$\frac{1}{30\,d}a\sqrt{\mathrm{Sec}[c+d\,x]}\,\Big(20\,(A+B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),2\Big]+12\,i\,(5\,A+3\,B)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\Big]+2\,\mathrm{Cos}[c+d\,x]\,\big(-6\,i\,(5\,A+3\,B)+10\,(A+B)\,\mathrm{Sin}[c+d\,x]+3\,B\,\mathrm{Sin}[2\,(c+d\,x)]\big)\Big)$$

Problem 464: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a\,\mathrm{Cos}[c+d\,x])\,(A+B\,\mathrm{Cos}[c+d\,x])}{\mathrm{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 172 leaves, 9 steps):

$$\frac{6\,a\,(A+B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\big[\frac{1}{2}\,(c+d\,x),2\big]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{5\,d}+\frac{1}{21\,d}2\,a\,(7\,A+5\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),2\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{2\,a\,B\,\mathrm{Sin}[c+d\,x]}{7\,d\,\mathrm{Sec}[c+d\,x]^{5/2}}+\frac{2\,a\,(A+B)\,\mathrm{Sin}[c+d\,x]}{5\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{2\,a\,(7\,A+5\,B)\,\mathrm{Sin}[c+d\,x]}{21\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 5, 162 leaves):

$$\frac{1}{420\,d}a\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\Big(40\,(7\,A+5\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\Big[\frac{1}{2}\,(c+d\,x),2\Big]+504\,i\,(A+B)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\Big]+2\,\mathrm{Cos}[c+d\,x]\,\big(-252\,i\,(A+B)+5\,(28\,A+23\,B)\,\mathrm{Sin}[c+d\,x]+42\,(A+B)\,\mathrm{Sin}[2\,(c+d\,x)]+15\,B\,\mathrm{Sin}[3\,(c+d\,x)]\big)\Big)$$

Problem 465: Result unnecessarily involves higher level functions.

$$\int (a+a\,\mathrm{Cos}[c+d\,x])^2\,(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 4, 199 leaves, 9 steps):

$$-\frac{1}{5\,d}4\,a^2\,(4\,A+5\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\Big[\frac{1}{2}\,(c+d\,x),2\Big]\,\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{4\,a^2\,(A+2\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\big[\frac{1}{2}\,(c+d\,x),2\big]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{3\,d}+\frac{4\,a^2\,(4\,A+5\,B)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{5\,d}+\frac{2\,a^2\,(7\,A+5\,B)\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,d}+\frac{2\,A\,\mathrm{Sec}[c+d\,x]^{3/2}\,\left(a^2+a^2\,\mathrm{Sec}[c+d\,x]\right)\,\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 5, 386 leaves):

$$\frac{1}{30\,d} a^2 \left(1+\text{Cos}[c+d\,x]\right)^2 \text{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4 \left(-12\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Csc}[c]\right.$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)-$$
$$15\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+$$
$$10\,A\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$20\,B\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\left.\sqrt{\text{Sec}[c+d\,x]}\,\left(6\,(4\,A+5\,B)\,\text{Cos}[d\,x]\,\text{Csc}[c]+\left(5\left(2\,A+B\right)+3\,A\,\text{Sec}[c+d\,x]\right)\text{Tan}[c+d\,x]\right)\right)$$

Problem 466: Result unnecessarily involves higher level functions.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 4, 160 leaves, 8 steps):

$$-\frac{4\,a^2\,A\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}}{d}+\frac{1}{3\,d}$$
$$4\,a^2\left(2\,A+3\,B\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{2\,a^2\left(5\,A+3\,B\right)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d}+\frac{2\,A\sqrt{\text{Sec}[c+d\,x]}\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 5, 188 leaves):

$$-\frac{1}{3\,d}i\,a^2\,\text{Sec}[c+d\,x]^{3/2}\left(-6\,A-6\,A\,\text{Cos}\left[2\left(c+d\,x\right)\right]+\right.$$
$$6\,A\,e^{-2\,i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)^{3/2}\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$2\left(2\,A+3\,B\right)e^{-i\,(c+d\,x)}\left(1+e^{2\,i\,(c+d\,x)}\right)^{3/2}\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$\left.2\,i\,A\,\text{Sin}[c+d\,x]+6\,i\,A\,\text{Sin}\left[2\left(c+d\,x\right)\right]+3\,i\,B\,\text{Sin}\left[2\left(c+d\,x\right)\right]\right)$$

Problem 467: Result unnecessarily involves higher level functions.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^2\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^{3/2}\,dx$$

Optimal (type 4, 160 leaves, 8 steps):

$$\frac{4 a^2 B \sqrt{\text{Cos}[c+d x]} \text{ EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{d}+\frac{1}{3 d}$$
$$4 a^2 (3 A+2 B) \sqrt{\text{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}+$$
$$\frac{2 a^2 (3 A-B) \sqrt{\text{Sec}[c+d x]} \text{ Sin}[c+d x]}{3 d}+\frac{2 B \left(a^2+a^2 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{3 d \sqrt{\text{Sec}[c+d x]}}$$

Result (type 5, 152 leaves):

$$\left(2 a^2 \left(12 i B \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]-\right.\right.$$
$$4 i (3 A+2 B) e^{i (c+d x)} \text{ Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, -e^{2 i (c+d x)}\right]+$$
$$\left.\left.\sqrt{1+e^{2 i (c+d x)}} \left(-6 i B+B \text{ Sin}[c+d x]+3 A \text{ Tan}[c+d x]\right)\right)\right) \Big/$$
$$\left(3 d \sqrt{1+e^{2 i (c+d x)}} \sqrt{\text{Sec}[c+d x]}\right)$$

Problem 468: Result unnecessarily involves higher level functions.

$$\int (a+a \text{ Cos}[c+d x])^2 (A+B \text{ Cos}[c+d x]) \sqrt{\text{Sec}[c+d x]} \, dx$$

Optimal (type 4, 166 leaves, 8 steps):

$$\frac{1}{5 d} 4 a^2 (5 A+4 B) \sqrt{\text{Cos}[c+d x]} \text{ EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}+$$
$$\frac{4 a^2 (2 A+B) \sqrt{\text{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 d}+$$
$$\frac{2 a^2 (5 A+7 B) \text{ Sin}[c+d x]}{15 d \sqrt{\text{Sec}[c+d x]}}+\frac{2 B \left(a^2+a^2 \text{Sec}[c+d x]\right) \text{Sin}[c+d x]}{5 d \text{ Sec}[c+d x]^{3/2}}$$

Result (type 5, 155 leaves):

$$\frac{1}{30 d} a^2 \sqrt{\text{Sec}[c+d x]} \left(40 (2 A+B) \sqrt{\text{Cos}[c+d x]} \text{ EllipticF}\left[\frac{1}{2} (c+d x), 2\right]+\right.$$
$$24 i (5 A+4 B) e^{-i (c+d x)} \sqrt{1+e^{2 i (c+d x)}} \text{ Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+$$
$$\left.2 \text{ Cos}[c+d x] \left(-12 i (5 A+4 B)+10 (A+2 B) \text{ Sin}[c+d x]+3 B \text{ Sin}[2 (c+d x)]\right)\right)$$

Problem 469: Result unnecessarily involves higher level functions.

$$\int \frac{(a+a \text{ Cos}[c+d x])^2 (A+B \text{ Cos}[c+d x])}{\sqrt{\text{Sec}[c+d x]}} \, dx$$

Optimal (type 4, 201 leaves, 9 steps):

$$\frac{1}{5\,d}4\,a^2\,(4\,A+3\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{1}{21\,d}4\,a^2\,(7\,A+6\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{2\,a^2\,(7\,A+9\,B)\,\text{Sin}[c+d\,x]}{35\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{4\,a^2\,(7\,A+6\,B)\,\text{Sin}[c+d\,x]}{21\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{2\,B\,\left(a^2+a^2\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{7\,d\,\text{Sec}[c+d\,x]^{5/2}}$$

Result (type 5, 208 leaves):

$$\frac{1}{420\,d}a^2\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\text{Sec}[c+d\,x]}\,\Bigg(80\,(7\,A+6\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]+$$
$$336\,i\,(4\,A+3\,B)\,e^{-i\,(c+d\,x)}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$2\,\text{Cos}[c+d\,x]\,\Big(-168\,i\,(4\,A+3\,B)+5\,(56\,A+51\,B)\,\text{Sin}[c+d\,x]+$$
$$42\,(A+2\,B)\,\text{Sin}[2\,(c+d\,x)]+15\,B\,\text{Sin}[3\,(c+d\,x)]\Big)\Bigg)\,\left(\text{Cos}[2\,c+d\,x]+i\,\text{Sin}[2\,c+d\,x]\right)$$

Problem 470: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int(a+a\,\text{Cos}[c+d\,x])^3\,(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{9/2}\,dx$$

Optimal (type 4, 244 leaves, 10 steps):

$$-\frac{1}{5\,d}4\,a^3\,(7\,A+9\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{1}{21\,d}4\,a^3\,(13\,A+21\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{4\,a^3\,(7\,A+9\,B)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{5\,d}+\frac{4\,a^3\,(41\,A+42\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d}+$$
$$\frac{2\,a\,A\,\text{Sec}[c+d\,x]^{3/2}\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{7\,d}+$$
$$\frac{2\,(11\,A+7\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)\,\text{Sin}[c+d\,x]}{35\,d}$$

Result (type 5, 605 leaves):

$$-\frac{1}{10\sqrt{2}\,d}7\,A\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6-\frac{1}{10\sqrt{2}\,d}9\,B\,e^{-i\,(2\,c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+d\,x)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6+\frac{1}{42\,d}13\,A\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3$$
$$\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Sec}[c+d\,x]}+\frac{1}{2\,d}$$
$$B\sqrt{\text{Cos}[c+d\,x]}\,(a+a\,\text{Cos}[c+d\,x])^3\,\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Sec}[c+d\,x]}+$$
$$(a+a\,\text{Cos}[c+d\,x])^3\,\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\sqrt{\text{Sec}[c+d\,x]}$$
$$\left(\frac{(7\,A+9\,B)\,\text{Cos}[d\,x]\,\text{Csc}[c]}{10\,d}+\frac{A\,\text{Sec}[c]\,\text{Sec}[c+d\,x]^3\,\text{Sin}[d\,x]}{28\,d}+\right.$$
$$\frac{\text{Sec}[c]\,\text{Sec}[c+d\,x]^2\,(5\,A\,\text{Sin}[c]+21\,A\,\text{Sin}[d\,x]+7\,B\,\text{Sin}[d\,x])}{140\,d}+\frac{1}{420\,d}\text{Sec}[c]\,\text{Sec}[c+d\,x]$$
$$\left.(63\,A\,\text{Sin}[c]+21\,B\,\text{Sin}[c]+130\,A\,\text{Sin}[d\,x]+105\,B\,\text{Sin}[d\,x])+\frac{(26\,A+21\,B)\,\text{Tan}[c]}{84\,d}\right)$$

Problem 471: Result unnecessarily involves higher level functions.

$$\int(a+a\,\text{Cos}[c+d\,x])^3\,(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 4, 211 leaves, 9 steps):

$$-\frac{1}{5\,d}4\,a^3\,(9\,A+5\,B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{1}{3\,d}4\,a^3\,(3\,A+5\,B)\sqrt{\text{Cos}[c+d\,x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{4\,a^3\,(21\,A+20\,B)\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{15\,d}+$$
$$\frac{2\,a\,A\sqrt{\text{Sec}[c+d\,x]}\,(a+a\,\text{Sec}[c+d\,x])^2\,\text{Sin}[c+d\,x]}{5\,d}+$$
$$\frac{2\,(9\,A+5\,B)\sqrt{\text{Sec}[c+d\,x]}\,(a^3+a^3\,\text{Sec}[c+d\,x])\,\text{Sin}[c+d\,x]}{15\,d}$$

Result (type 5, 282 leaves):

$$\frac{1}{30\,d} a^3 e^{-i\,(2c+d x)} \text{Csc}[c]\,\text{Sec}[c]\,\sqrt{\text{Sec}[c+d x]} \left(-6\,(9A+5B)\,e^{-i\,(3c+d x)}\,\left(-1+e^{4 i c}\right)\,\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]+\frac{1}{2}\text{Sec}[c+d x]^2\,\text{Sin}[2c]\,\left(18\,i\,(9A+5B)\,\text{Cos}[c+d x]+54\,i\,A\,\text{Cos}[3\,(c+d x)]+30\,i\,B\,\text{Cos}[3\,(c+d x)]+40\,(3A+5B)\,\text{Cos}[c+d x]^{5/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]+66\,A\,\text{Sin}[c+d x]+45\,B\,\text{Sin}[c+d x]+30\,A\,\text{Sin}[2\,(c+d x)]+10\,B\,\text{Sin}[2\,(c+d x)]+54\,A\,\text{Sin}[3\,(c+d x)]+45\,B\,\text{Sin}[3\,(c+d x)]\right)\right)\,(\text{Cos}[2c+d x]+i\,\text{Sin}[2c+d x])$$

Problem 472: Result unnecessarily involves higher level functions.

$$\int (a+a\,\text{Cos}[c+d x])^3\,(A+B\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{5/2}\,dx$$

Optimal (type 4, 199 leaves, 9 steps):

$$-\frac{4 a^3 (A-B) \sqrt{\text{Cos}[c+d x]}\,\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{d}+\frac{20 a^3 (A+B) \sqrt{\text{Cos}[c+d x]}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}}{3 d}+\frac{4 a^3 (4A+B)\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{3 d}+\frac{2 a B\,(a+a\,\text{Sec}[c+d x])^2\,\text{Sin}[c+d x]}{3 d \sqrt{\text{Sec}[c+d x]}}+\frac{2 (A-B)\sqrt{\text{Sec}[c+d x]}\,\left(a^3+a^3\,\text{Sec}[c+d x]\right)\,\text{Sin}[c+d x]}{3 d}$$

Result (type 5, 192 leaves):

$$\frac{1}{6 d} a^3\,\text{Sec}[c+d x]^{3/2}\left(12\,i\,A-12\,i\,B+12\,i\,A\,\text{Cos}[2\,(c+d x)]-12\,i\,B\,\text{Cos}[2\,(c+d x)]+40\,(A+B)\,\text{Cos}[c+d x]^{3/2}\,\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]-12\,i\,(A-B)\,e^{-2 i\,(c+d x)}\,\left(1+e^{2 i\,(c+d x)}\right)^{3/2}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]+4\,A\,\text{Sin}[c+d x]+B\,\text{Sin}[c+d x]+18\,A\,\text{Sin}[2\,(c+d x)]+6\,B\,\text{Sin}[2\,(c+d x)]+B\,\text{Sin}[3\,(c+d x)]\right)$$

Problem 473: Result unnecessarily involves higher level functions.

$$\int (a+a\,\text{Cos}[c+d x])^3\,(A+B\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{3/2}\,dx$$

Optimal (type 4, 211 leaves, 9 steps):

$$\frac{1}{5d}4a^3(5A+9B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+$$
$$\frac{1}{3d}4a^3(5A+3B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+$$
$$\frac{4a^3(5A-6B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{15d}+\frac{2aB(a+a\,\text{Sec}[c+dx])^2\,\text{Sin}[c+dx]}{5d\,\text{Sec}[c+dx]^{3/2}}+$$
$$\frac{2(5A+9B)\left(a^3+a^3\,\text{Sec}[c+dx]\right)\text{Sin}[c+dx]}{15d\sqrt{\text{Sec}[c+dx]}}$$

Result (type 5, 220 leaves):

$$\frac{1}{30d}a^3e^{-i(2c+dx)}\sqrt{\text{Sec}[c+dx]}\ \Big(-120\,i\,A\,\text{Cos}[c+dx]-$$
$$216\,i\,B\,\text{Cos}[c+dx]+40(5A+3B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]+$$
$$24\,i\,(5A+9B)\,e^{-i(c+dx)}\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]+$$
$$60A\,\text{Sin}[c+dx]+3B\,\text{Sin}[c+dx]+10A\,\text{Sin}[2(c+dx)]+$$
$$30B\,\text{Sin}[2(c+dx)]+3B\,\text{Sin}[3(c+dx)]\Big)\ (\text{Cos}[2c+dx]+i\,\text{Sin}[2c+dx])$$

Problem 474: Result unnecessarily involves higher level functions.

$$\int(a+a\,\text{Cos}[c+dx])^3\,(A+B\,\text{Cos}[c+dx])\sqrt{\text{Sec}[c+dx]}\ dx$$

Optimal (type 4, 211 leaves, 9 steps):

$$\frac{1}{5d}4a^3(9A+7B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+$$
$$\frac{1}{21d}4a^3(21A+13B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}+$$
$$\frac{4a^3(42A+41B)\,\text{Sin}[c+dx]}{105d\sqrt{\text{Sec}[c+dx]}}+\frac{2aB(a+a\,\text{Sec}[c+dx])^2\,\text{Sin}[c+dx]}{7d\,\text{Sec}[c+dx]^{5/2}}+$$
$$\frac{2(7A+11B)\left(a^3+a^3\,\text{Sec}[c+dx]\right)\text{Sin}[c+dx]}{35d\,\text{Sec}[c+dx]^{3/2}}$$

Result (type 5, 208 leaves):

$$\frac{1}{420d}a^3e^{-i(2c+dx)}\sqrt{\text{Sec}[c+dx]}\ \Big(80(21A+13B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]+$$
$$336\,i\,(9A+7B)\,e^{-i(c+dx)}\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]+$$
$$2\,\text{Cos}[c+dx]\,\big(-168\,i\,(9A+7B)+5(84A+107B)\,\text{Sin}[c+dx]+$$
$$42(A+3B)\,\text{Sin}[2(c+dx)]+15B\,\text{Sin}[3(c+dx)]\big)\Big)\ (\text{Cos}[2c+dx]+i\,\text{Sin}[2c+dx])$$

Problem 475: Result unnecessarily involves higher level functions.

$$\int \frac{(a + a\,\text{Cos}[c + d\,x])^3\,(A + B\,\text{Cos}[c + d\,x])}{\sqrt{\text{Sec}[c + d\,x]}}\,dx$$

Optimal (type 4, 244 leaves, 10 steps):

$$\frac{1}{15\,d}4\,a^3\,(21\,A + 17\,B)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]} + \frac{1}{21\,d}4\,a^3\,(13\,A + 11\,B)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]} + \frac{4\,a^3\,(24\,A + 23\,B)\,\text{Sin}[c + d\,x]}{105\,d\,\text{Sec}[c + d\,x]^{3/2}} + \frac{4\,a^3\,(13\,A + 11\,B)\,\text{Sin}[c + d\,x]}{21\,d\,\sqrt{\text{Sec}[c + d\,x]}} + \frac{2\,a\,B\,(a + a\,\text{Sec}[c + d\,x])^2\,\text{Sin}[c + d\,x]}{9\,d\,\text{Sec}[c + d\,x]^{7/2}} + \frac{2\,(9\,A + 13\,B)\,(a^3 + a^3\,\text{Sec}[c + d\,x])\,\text{Sin}[c + d\,x]}{63\,d\,\text{Sec}[c + d\,x]^{5/2}}$$

Result (type 5, 197 leaves):

$$\frac{1}{2520\,d}a^3\,\sqrt{\text{Sec}[c + d\,x]}\,\left(480\,(13\,A + 11\,B)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right] + 672\,i\,(21\,A + 17\,B)\,e^{-i\,(c+d\,x)}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\,\frac{1}{2},\,\frac{3}{4},\,-e^{2\,i\,(c+d\,x)}\right] + 2\,\text{Cos}[c + d\,x]\,\left(-7056\,i\,A - 5712\,i\,B + 30\,(107\,A + 97\,B)\,\text{Sin}[c + d\,x] + 14\,(54\,A + 73\,B)\,\text{Sin}[2\,(c + d\,x)] + 90\,A\,\text{Sin}[3\,(c + d\,x)] + 270\,B\,\text{Sin}[3\,(c + d\,x)] + 35\,B\,\text{Sin}[4\,(c + d\,x)]\right)\right)$$

Problem 476: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(A + B\,\text{Cos}[c + d\,x])\,\text{Sec}[c + d\,x]^{5/2}}{a + a\,\text{Cos}[c + d\,x]}\,dx$$

Optimal (type 4, 193 leaves, 9 steps):

$$\frac{3\,(A - B)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{a\,d} + \frac{(5\,A - 3\,B)\,\sqrt{\text{Cos}[c + d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c + d\,x),\,2\right]\,\sqrt{\text{Sec}[c + d\,x]}}{3\,a\,d} - \frac{3\,(A - B)\,\sqrt{\text{Sec}[c + d\,x]}\,\text{Sin}[c + d\,x]}{a\,d} + \frac{(5\,A - 3\,B)\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x]}{3\,a\,d} - \frac{(A - B)\,\text{Sec}[c + d\,x]^{5/2}\,\text{Sin}[c + d\,x]}{d\,(a + a\,\text{Sec}[c + d\,x])}$$

Result (type 5, 631 leaves):

$$\left(3 A e^{-i(2c+dx)} \sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}} \operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(\sqrt{2}\, d\, (a+a\operatorname{Cos}[c+dx])\right) -$$

$$\left(3 B e^{-i(2c+dx)} \sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}} \operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(\sqrt{2}\, d\, (a+a\operatorname{Cos}[c+dx])\right) +$$

$$\left(5 A \operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \sqrt{\operatorname{Cos}[c+dx]}\ \operatorname{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \sqrt{\operatorname{Sec}[c+dx]}\ \operatorname{Sin}[c]\right) \Big/ \left(3 d\,(a+a\operatorname{Cos}[c+dx])\right) -$$

$$\left(B \operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \sqrt{\operatorname{Cos}[c+dx]}\ \operatorname{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \sqrt{\operatorname{Sec}[c+dx]}\ \operatorname{Sin}[c]\right) \Big/ \left(d\,(a+a\operatorname{Cos}[c+dx])\right) +$$

$$\frac{1}{a+a\operatorname{Cos}[c+dx]} \operatorname{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2 \sqrt{\operatorname{Sec}[c+dx]} \left(-\frac{3(A-B)\operatorname{Cos}[dx]\operatorname{Csc}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}\right]}{d} + \frac{2\operatorname{Sec}\left[\frac{c}{2}\right]\operatorname{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\operatorname{Sin}\left[\frac{dx}{2}\right]-B\operatorname{Sin}\left[\frac{dx}{2}\right]\right)}{d} + \frac{4A\operatorname{Sec}[c]\operatorname{Sec}[c+dx]\operatorname{Sin}[dx]}{3d} + \frac{2\left(2A+5A\operatorname{Cos}[c]-3B\operatorname{Cos}[c]\right)\operatorname{Sec}[c]\operatorname{Tan}\left[\frac{c}{2}\right]}{3d}\right)$$

Problem 477: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{(A+B\operatorname{Cos}[c+dx])\operatorname{Sec}[c+dx]^{3/2}}{a+a\operatorname{Cos}[c+dx]}\,dx$$

Optimal (type 4, 159 leaves, 8 steps):

$$-\frac{(3A-B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}-\frac{(A-B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a\,d}+\frac{(3A-B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{a\,d}-\frac{(A-B)\,\text{Sec}[c+dx]^{3/2}\,\text{Sin}[c+dx]}{d\,(a+a\,\text{Sec}[c+dx])}$$

Result (type 5, 595 leaves):

$$-\Bigg(\Bigg(\Bigg(3A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\Bigg)\Big/\left(\sqrt{2}\,d\,(a+a\,\text{Cos}[c+dx])\right)\Bigg)+$$

$$\Bigg(B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\ \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i(c+dx)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\Bigg)\Big/\left(\sqrt{2}\,d\,(a+a\,\text{Cos}[c+dx])\right)-$$

$$\left(A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c]\right)\Big/\left(d\,(a+a\,\text{Cos}[c+dx])\right)+$$

$$\left(B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Cos}[c+dx]}\ \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c]\right)\Big/\left(d\,(a+a\,\text{Cos}[c+dx])\right)+\frac{1}{a+a\,\text{Cos}[c+dx]}$$

$$\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\sqrt{\text{Sec}[c+dx]}\left(\frac{(3A-B)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{d}-\frac{2\,(A-B)\,\text{Tan}\left[\frac{c}{2}\right]}{d}\right)$$

Problem 478: Result unnecessarily involves higher level functions.

$$\int \frac{(A + B \operatorname{Cos}[c + d x]) \sqrt{\operatorname{Sec}[c + d x]}}{a + a \operatorname{Cos}[c + d x]} \, dx$$

Optimal (type 4, 123 leaves, 7 steps):

$$\frac{(A - B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{a d} + \frac{(A + B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{a d} - \frac{(A - B) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d (a + a \operatorname{Sec}[c + d x])}$$

Result (type 5, 185 leaves):

$$\left(\operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^2 \left(\frac{4 (A + B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{d} - \frac{1}{d \left(1 + e^{i (c+d x)}\right)} 4 i (A - B) e^{-i (c+d x)} \left(1 + e^{2 i (c+d x)} - \left(1 + e^{i (c+d x)}\right) \sqrt{1 + e^{2 i (c+d x)}} \operatorname{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \sqrt{\operatorname{Sec}[c + d x]}\right)\right) \Big/ (2 a (1 + \operatorname{Cos}[c + d x]))$$

Problem 479: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Cos}[c + d x]}{(a + a \operatorname{Cos}[c + d x]) \sqrt{\operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 125 leaves, 7 steps):

$$-\frac{(A - 3 B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{a d} + \frac{(A - B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{a d} + \frac{(A - B) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d (a + a \operatorname{Sec}[c + d x])}$$

Result (type 5, 402 leaves):

$$\frac{1}{2\,a\,d\,\left(1+\text{Cos}[c+d\,x]\right)}\,\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\left(-2\,\sqrt{2}\,A\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Csc}[c]\right.$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+$$
$$6\,\sqrt{2}\,B\,e^{-i\,(2\,c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\text{Csc}[c]$$
$$\left(1+e^{2\,i\,(c+d\,x)}+\left(-1+e^{2\,i\,c}\right)\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]\right)+$$
$$\frac{1}{\sqrt{\text{Sec}[c+d\,x]}}2\,\left(\left(A-2\,B\right)\,\text{Cos}\left[\frac{1}{2}\,(c-d\,x)\right]-B\,\text{Cos}\left[\frac{1}{2}\,(3\,c+d\,x)\right]\right)\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]$$
$$\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,A\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}-$$
$$\left.4\,B\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}\right)$$

Problem 480: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\left(a+a\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 163 leaves, 8 steps):

$$\frac{3\,(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{a\,d}-$$
$$\frac{\left(3\,A-5\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,a\,d}-$$
$$\frac{\left(3\,A-5\,B\right)\,\text{Sin}[c+d\,x]}{3\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{(A-B)\,\text{Sin}[c+d\,x]}{d\,\sqrt{\text{Sec}[c+d\,x]}\,\left(a+a\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 654 leaves):

$$\left(3 A e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(\sqrt{2} d (a+a \operatorname{Cos}[c+d x])\right) -$$

$$\left(3 B e^{-i (2 c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \operatorname{Csc}\left[\frac{c}{2}\right] \left(1+e^{2 i (c+d x)}+\left(-1+e^{2 i c}\right) \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]\right) \operatorname{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(\sqrt{2} d (a+a \operatorname{Cos}[c+d x])\right) -$$

$$\left(A \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c]\right) \Big/ \left(d (a+a \operatorname{Cos}[c+d x])\right) +$$

$$\left(5 B \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Csc}\left[\frac{c}{2}\right] \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \operatorname{Sec}\left[\frac{c}{2}\right] \sqrt{\operatorname{Sec}[c+d x]} \operatorname{Sin}[c]\right) \Big/ \left(3 d (a+a \operatorname{Cos}[c+d x])\right) + \frac{1}{a+a \operatorname{Cos}[c+d x]}$$

$$\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \sqrt{\operatorname{Sec}[c+d x]} \left(-\frac{(A-B) (2+\operatorname{Cos}[2 c]) \operatorname{Cos}[d x] \operatorname{Csc}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}\right]}{d} + \frac{2 B \operatorname{Cos}[2 d x] \operatorname{Sin}[2 c]}{3 d} + \frac{2 \operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \operatorname{Sin}\left[\frac{d x}{2}\right]-B \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{d} + \frac{4 (A-B) \operatorname{Cos}[c] \operatorname{Sin}[d x]}{d} + \frac{2 B \operatorname{Cos}[2 c] \operatorname{Sin}[2 d x]}{3 d} + \frac{2 (A-B) \operatorname{Tan}\left[\frac{c}{2}\right]}{d}\right)$$

Problem 481: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B \operatorname{Cos}[c+d x]}{(a+a \operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x]^{5/2}} \, dx$$

Optimal (type 4, 196 leaves, 9 steps):

$$-\frac{1}{5ad}3\,(5A-7B)\,\sqrt{\mathrm{Cos}[c+dx]}\;\mathrm{EllipticE}\Big[\frac{1}{2}(c+dx),2\Big]\sqrt{\mathrm{Sec}[c+dx]}+\frac{5\,(A-B)\,\sqrt{\mathrm{Cos}[c+dx]}\;\mathrm{EllipticF}\big[\frac{1}{2}(c+dx),2\big]\sqrt{\mathrm{Sec}[c+dx]}}{3ad}-\frac{(5A-7B)\,\mathrm{Sin}[c+dx]}{5ad\,\mathrm{Sec}[c+dx]^{3/2}}+\frac{5\,(A-B)\,\mathrm{Sin}[c+dx]}{3ad\sqrt{\mathrm{Sec}[c+dx]}}+\frac{(A-B)\,\mathrm{Sin}[c+dx]}{d\,\mathrm{Sec}[c+dx]^{3/2}\,(a+a\,\mathrm{Sec}[c+dx])}$$

Result (type 5, 498 leaves):

$$\frac{1}{60ad\,(1+\mathrm{Cos}[c+dx])}\mathrm{Cos}\Big[\frac{1}{2}(c+dx)\Big]^2\Bigg(-180\sqrt{2}\,A\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\;\mathrm{Csc}[c]\Big(1+e^{2i(c+dx)}+\big(-1+e^{2ic}\big)\sqrt{1+e^{2i(c+dx)}}\;\mathrm{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\Big]\Big)+$$
$$252\sqrt{2}\,B\,e^{-i(2c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\;\mathrm{Csc}[c]\Big(1+e^{2i(c+dx)}+\big(-1+e^{2ic}\big)\sqrt{1+e^{2i(c+dx)}}\;\mathrm{Hypergeometric2F1}\Big[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i(c+dx)}\Big]\Big)+$$
$$200A\sqrt{\mathrm{Cos}[c+dx]}\;\mathrm{EllipticF}\Big[\frac{1}{2}(c+dx),2\Big]\sqrt{\mathrm{Sec}[c+dx]}-200B\sqrt{\mathrm{Cos}[c+dx]}\;\mathrm{EllipticF}\Big[\frac{1}{2}(c+dx),2\Big]\sqrt{\mathrm{Sec}[c+dx]}+$$
$$\sqrt{\mathrm{Sec}[c+dx]}\;\Big(3\,\big(40A-51B+(20A-33B)\,\mathrm{Cos}[2c]\big)\,\mathrm{Cos}[dx]\,\mathrm{Csc}\Big[\frac{c}{2}\Big]\,\mathrm{Sec}\Big[\frac{c}{2}\Big]+40\,(A-B)\,\mathrm{Cos}[2dx]\,\mathrm{Sin}[2c]+12B\,\mathrm{Cos}[3dx]\,\mathrm{Sin}[3c]-120\,(A-B)\,\mathrm{Sec}\Big[\frac{c}{2}\Big]\,\mathrm{Sec}\Big[\frac{1}{2}(c+dx)\Big]\,\mathrm{Sin}\Big[\frac{dx}{2}\Big]-12\,(20A-33B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[dx]+40\,(A-B)\,\mathrm{Cos}[2c]\,\mathrm{Sin}[2dx]+12B\,\mathrm{Cos}[3c]\,\mathrm{Sin}[3dx]-120\,(A-B)\,\mathrm{Tan}\Big[\frac{c}{2}\Big]\Big)\Bigg)$$

Problem 482: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(A+B\,\mathrm{Cos}[c+dx])\,\mathrm{Sec}[c+dx]^{3/2}}{(a+a\,\mathrm{Cos}[c+dx])^2}\,dx$$

Optimal (type 4, 208 leaves, 9 steps):

$$-\frac{(4A-B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{a^2 d}-\frac{(5A-2B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{3a^2 d}+\frac{(4A-B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{a^2 d}-\frac{(5A-2B)\ \text{Sec}[c+dx]^{3/2}\ \text{Sin}[c+dx]}{3a^2 d\,(1+\text{Sec}[c+dx])}-\frac{(A-B)\ \text{Sec}[c+dx]^{5/2}\ \text{Sin}[c+dx]}{3d\,(a+a\,\text{Sec}[c+dx])^2}$$

Result (type 5, 689 leaves) :

$$-\left(\left(\left(4\sqrt{2}\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.\right.\right.$$

$$\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(d\left(a+a\,\text{Cos}[c+d x]\right)^2\right)\Bigg)+$$

$$\left(\sqrt{2}\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(d\left(a+a\,\text{Cos}[c+d x]\right)^2\right)-$$

$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\right.$$

$$\left.\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c]\right)\Big/\left(3\,d\left(a+a\,\text{Cos}[c+d x]\right)^2\right)+$$

$$\left(4\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$

$$\left.\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c]\right)\Big/\left(3\,d\left(a+a\,\text{Cos}[c+d x]\right)^2\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Sec}[c+d x]}\right.$$

$$\left(\frac{2\,(4A-B)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(5\,A\,\text{Sin}\left[\frac{d x}{2}\right]-2\,B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3\,d}-\right.$$

$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d x}{2}\right]-B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3\,d}-\frac{4\,(5A-2B)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}-$$

$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d x]\right)^2$$

Problem 483: Result unnecessarily involves higher level functions.

$$\int\frac{\left(A+B\,\text{Cos}[c+d x]\right)\sqrt{\text{Sec}[c+d x]}}{\left(a+a\,\text{Cos}[c+d x]\right)^2}\,dx$$

Optimal (type 4, 161 leaves, 8 steps):

$$\frac{A\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+\frac{(2\,A+B)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}-\frac{A\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 263 leaves):

$$\frac{1}{6\,a^2\,d\,(1+\text{Cos}[c+d\,x])^2}\,e^{-i\,(2\,c+d\,x)}\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}$$
$$\Bigg(3\,i\,A\,e^{-2\,i\,(c+d\,x)}\left(1+e^{i\,(c+d\,x)}\right)^3\sqrt{1+e^{2\,i\,(c+d\,x)}}\ \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+d\,x)}\right]+$$
$$8\,(2\,A+B)\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\sqrt{\text{Cos}[c+d\,x]}$$
$$\text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]+i\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)-$$
$$2\,i\,\text{Cos}[c+d\,x]\,(7\,A-B+(5\,A+B)\,\text{Cos}[c+d\,x]-i\,(A-B)\,\text{Sin}[c+d\,x])\Bigg)$$
$$\left(\text{Cos}\left[\frac{1}{2}(3\,c+d\,x)\right]+i\,\text{Sin}\left[\frac{1}{2}(3\,c+d\,x)\right]\right)$$

Problem 484: Result unnecessarily involves higher level functions.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{(a+a\,\text{Cos}[c+d\,x])^2\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 168 leaves, 8 steps):

$$-\frac{B\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{a^2\,d}+\frac{(A+2\,B)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d\,x),2\right]\sqrt{\text{Sec}[c+d\,x]}}{3\,a^2\,d}+\frac{(A+2\,B)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,a^2\,d\,(1+\text{Sec}[c+d\,x])}-\frac{(A-B)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{3\,d\,(a+a\,\text{Sec}[c+d\,x])^2}$$

Result (type 5, 264 leaves):

$$\frac{1}{6 a^2 d \left(1+\text{Cos}[c+d x]\right)^2} e^{-i (2 c+d x)} \text{Cos}\left[\frac{1}{2} (c+d x)\right] \sqrt{\text{Sec}[c+d x]} \left(8 (A+2 B) \text{Cos}\left[\frac{1}{2} (c+d x)\right]^3 \sqrt{\text{Cos}[c+d x]} \right.$$
$$\text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \left(\text{Cos}\left[\frac{1}{2} (c+d x)\right]+i \text{Sin}\left[\frac{1}{2} (c+d x)\right]\right) -$$
$$i \left(3 B e^{-2 i (c+d x)} \left(1+e^{i (c+d x)}\right)^3 \sqrt{1+e^{2 i (c+d x)}} \text{Hypergeometric2F1}\left[-\frac{1}{4}, \frac{1}{2}, \frac{3}{4}, -e^{2 i (c+d x)}\right]+\right.$$
$$\left.\left. 2 \text{Cos}[c+d x] \left(-A-5 B+(A-7 B) \text{Cos}[c+d x]+i (A-B) \text{Sin}[c+d x]\right)\right)\right)$$
$$\left(\text{Cos}\left[\frac{1}{2} (3 c+d x)\right]+i \text{Sin}\left[\frac{1}{2} (3 c+d x)\right]\right)$$

Problem 485: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B \text{Cos}[c+d x]}{\left(a+a \text{Cos}[c+d x]\right)^2 \text{Sec}[c+d x]^{3/2}} \, dx$$

Optimal (type 4, 176 leaves, 8 steps):

$$-\frac{(A-4 B) \sqrt{\text{Cos}[c+d x]} \text{EllipticE}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a^2 d}+$$
$$\frac{(2 A-5 B) \sqrt{\text{Cos}[c+d x]} \text{EllipticF}\left[\frac{1}{2} (c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 a^2 d}+$$
$$\frac{(2 A-5 B) \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 a^2 d \left(1+\text{Sec}[c+d x]\right)}+\frac{(A-B) \sqrt{\text{Sec}[c+d x]} \text{Sin}[c+d x]}{3 d \left(a+a \text{Sec}[c+d x]\right)^2}$$

Result (type 5, 708 leaves):

$$-\left(\left(\sqrt{2}\, A\, e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\bigg/\left(d\left(a+a\,\text{Cos}[c+d x]\right)^2\right)\right)+$$

$$\left(4\sqrt{2}\, B\, e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2 i\,(c+d x)}+\left(-1+e^{2 i c}\right)\sqrt{1+e^{2 i\,(c+d x)}}\, \text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2 i\,(c+d x)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\bigg/\left(d\left(a+a\,\text{Cos}[c+d x]\right)^2\right)+$$

$$\left(4\, A\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c]\right)\bigg/\left(3 d\left(a+a\,\text{Cos}[c+d x]\right)^2\right)-$$

$$\left(10\, B\, \text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\, \text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c]\right)\bigg/\left(3 d\left(a+a\,\text{Cos}[c+d x]\right)^2\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Sec}[c+d x]}\left(-\frac{2\left(-A+3B+B\,\text{Cos}[2c]\right)\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\left(4A\,\text{Sin}\left[\frac{d x}{2}\right]-7B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d x}{2}\right]-B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3d}+\frac{8B\,\text{Cos}[c]\,\text{Sin}[d x]}{d}-\frac{4(4A-7B)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{2(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\bigg/\left(a+a\,\text{Cos}[c+d x]\right)^2$$

Problem 486: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d x]}{\left(a+a\,\text{Cos}[c+d x]\right)^2\text{Sec}[c+d x]^{5/2}}\,dx$$

Optimal (type 4, 206 leaves, 9 steps):

$$\frac{(4 A-7 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{a^2 d}-$$

$$\frac{5 (A-2 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2}(c+d x), 2\right] \sqrt{\text{Sec}[c+d x]}}{3 a^2 d}-\frac{5 (A-2 B) \text{Sin}[c+d x]}{3 a^2 d \sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{(4 A-7 B) \text{Sin}[c+d x]}{3 a^2 d \sqrt{\text{Sec}[c+d x]}\ (1+\text{Sec}[c+d x])}+\frac{(A-B) \text{Sin}[c+d x]}{3 d \sqrt{\text{Sec}[c+d x]}\ (a+a \text{Sec}[c+d x])^2}$$

Result (type 5, 753 leaves) :

$$\left(4\sqrt{2}\,A\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left(1+e^{2i\,(c+d x)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+d x)}\right]\right)$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(d\,\left(a+a\,\text{Cos}[c+d x]\right)^2\right)-$$
$$\left(7\sqrt{2}\,B\,e^{-i\,(2c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2i\,(c+d x)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left(1+e^{2i\,(c+d x)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+d x)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+d x)}\right]\right)$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(d\,\left(a+a\,\text{Cos}[c+d x]\right)^2\right)-$$
$$\left(10\,A\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c]\right)\Big/\left(3\,d\,\left(a+a\,\text{Cos}[c+d x]\right)^2\right)+$$
$$\left(20\,B\,\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Cos}[c+d x]}\,\text{Csc}\left[\frac{c}{2}\right]\,\text{EllipticF}\left[\frac{1}{2}\,(c+d x),2\right]\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c]\right)\Big/\left(3\,d\,\left(a+a\,\text{Cos}[c+d x]\right)^2\right)+$$
$$\left(\text{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^4\sqrt{\text{Sec}[c+d x]}\,\left(-\frac{1}{d}2\,\left(3A-5B+A\,\text{Cos}[2c]-2B\,\text{Cos}[2c]\right)\,\text{Cos}[d x]\,\text{Csc}\left[\frac{c}{2}\right]\right.\right.$$
$$\text{Sec}\left[\frac{c}{2}\right]+\frac{4\,B\,\text{Cos}[2 d x]\,\text{Sin}[2c]}{3\,d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]\,\left(7\,A\,\text{Sin}\left[\frac{d x}{2}\right]-10\,B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3\,d}-$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3\left(A\,\text{Sin}\left[\frac{d x}{2}\right]-B\,\text{Sin}\left[\frac{d x}{2}\right]\right)}{3\,d}+\frac{8\,(A-2B)\,\text{Cos}[c]\,\text{Sin}[d x]}{d}+$$
$$\frac{4\,B\,\text{Cos}[2c]\,\text{Sin}[2 d x]}{3\,d}+\frac{4\,(7A-10B)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}-$$
$$\left.\left.\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d x]\right)^2$$

Problem 487: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\text{Cos}[c+d x]\right)\,\text{Sec}[c+d x]^{3/2}}{\left(a+a\,\text{Cos}[c+d x]\right)^3}\,dx$$

Optimal (type 4, 261 leaves, 10 steps):

$$-\frac{(49 A-9 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticE}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{10 a^3 d}-\frac{(13 A-3 B) \sqrt{\text{Cos}[c+d x]}\ \text{EllipticF}\left[\frac{1}{2} (c+d x),2\right] \sqrt{\text{Sec}[c+d x]}}{6 a^3 d}+\frac{(49 A-9 B) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{10 a^3 d}-\frac{(A-B) \text{Sec}[c+d x]^{7/2} \text{Sin}[c+d x]}{5 d (a+a \text{Sec}[c+d x])^3}-\frac{(8 A-3 B) \text{Sec}[c+d x]^{5/2} \text{Sin}[c+d x]}{15 a d (a+a \text{Sec}[c+d x])^2}-\frac{(13 A-3 B) \text{Sec}[c+d x]^{3/2} \text{Sin}[c+d x]}{6 d \left(a^3+a^3 \text{Sec}[c+d x]\right)}$$

Result (type 5, 778 leaves):

$$-\left(\left(\left(49\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,d\,(a+a\,\text{Cos}[c+dx])^3\right)+\left(9\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,d\,(a+a\,\text{Cos}[c+dx])^3\right)-\left(26\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c]\right)\Big/\left(3\,d\,(a+a\,\text{Cos}[c+dx])^3\right)+\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c]\right)\Big/\left(d\,(a+a\,\text{Cos}[c+dx])^3\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+dx]}\left(\frac{2\,(49A-9B)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(8\,A\,\text{Sin}\left[\frac{dx}{2}\right]-3\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(13\,A\,\text{Sin}\left[\frac{dx}{2}\right]-3\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}-\frac{4\,(13A-3B)\,\text{Tan}\left[\frac{c}{2}\right]}{3d}-\frac{4\,(8A-3B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}-\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+dx]\right)^3$$

Problem 488: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{(A+B\,\text{Cos}[c+dx])\,\sqrt{\text{Sec}[c+dx]}}{(a+a\,\text{Cos}[c+dx])^3}\,dx$$

Optimal (type 4, 222 leaves, 9 steps):

$$\frac{(9A+B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(3A+B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}-\frac{(A-B)\ \text{Sec}[c+dx]^{5/2}\ \text{Sin}[c+dx]}{5d\,(a+a\,\text{Sec}[c+dx])^3}-\frac{(6A-B)\ \text{Sec}[c+dx]^{3/2}\ \text{Sin}[c+dx]}{15ad\,(a+a\,\text{Sec}[c+dx])^2}-\frac{(9A+B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{10d\,(a^3+a^3\,\text{Sec}[c+dx])}$$

Result (type 5, 773 leaves):

$$\left(9\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\left(a+a\,\text{Cos}[c+dx]\right)^3\right)+$$

$$\left(\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\left(a+a\,\text{Cos}[c+dx]\right)^3\right)+$$

$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\left(c+dx\right),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c]\right)\Big/\left(d\left(a+a\,\text{Cos}[c+dx]\right)^3\right)+$$

$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+dx]}\,\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\left(c+dx\right),2\right]\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c]\right)\Big/\left(3d\left(a+a\,\text{Cos}[c+dx]\right)^3\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+dx]}\left(-\frac{2\left(9A+B\right)\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5d}+\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(3A\,\text{Sin}\left[\frac{dx}{2}\right]+2B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+\frac{4\left(3A+B\right)\text{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{4\left(3A+2B\right)\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{2\left(A-B\right)\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+dx]\right)^3$$

Problem 489: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+dx]}{\left(a+a\,\text{Cos}[c+dx]\right)^3\sqrt{\text{Sec}[c+dx]}}\,dx$$

Optimal (type 4, 216 leaves, 9 steps):

$$\frac{(A-B)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticE}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{(A+B)\sqrt{\text{Cos}[c+d\,x]}\ \text{EllipticF}\left[\frac{1}{2}\left(c+d\,x\right),2\right]\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}-\frac{(A-B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\left(a+a\,\text{Sec}[c+d\,x]\right)^3}-\frac{(4\,A+B)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{15\,a\,d\left(a+a\,\text{Sec}[c+d\,x]\right)^2}+\frac{(A+B)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]}{6\,d\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 772 leaves):

$$\left(\sqrt{2}\, A\, e^{-i\,(2c+dx)} \sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\; \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right) \text{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(5\,d\,\left(a+a\,\text{Cos}[c+dx]\right)^3\right) -$$

$$\left(\sqrt{2}\, B\, e^{-i\,(2c+dx)} \sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\; \text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \text{Csc}\left[\frac{c}{2}\right] \left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\;\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right) \text{Sec}\left[\frac{c}{2}\right]\right) \Big/ \left(5\,d\,\left(a+a\,\text{Cos}[c+dx]\right)^3\right) +$$

$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \sqrt{\text{Cos}[c+dx]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\,(c+dx),2\right] \text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+dx]}\;\text{Sin}[c]\right) \Big/ \left(3\,d\,\left(a+a\,\text{Cos}[c+dx]\right)^3\right) +$$

$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \sqrt{\text{Cos}[c+dx]}\;\text{Csc}\left[\frac{c}{2}\right]\text{EllipticF}\left[\frac{1}{2}\,(c+dx),2\right] \text{Sec}\left[\frac{c}{2}\right] \sqrt{\text{Sec}[c+dx]}\;\text{Sin}[c]\right) \Big/ \left(3\,d\,\left(a+a\,\text{Cos}[c+dx]\right)^3\right) + \left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6 \sqrt{\text{Sec}[c+dx]}\right.$$

$$\left(-\frac{2\,(A-B)\,\text{Cos}[dx]\,\text{Csc}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}\right]}{5\,d} + \frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(2\,A\,\text{Sin}\left[\frac{dx}{2}\right]-7\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15\,d} - \frac{2\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5\,d} + \frac{4\,\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]+B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d} + \frac{4\,(A+B)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d} + \frac{4\,(2A-7B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d} - \frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\Bigg) \Big/ \left(a+a\,\text{Cos}[c+dx]\right)^3$$

Problem 490: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\text{Cos}[c+dx]}{\left(a+a\,\text{Cos}[c+dx]\right)^3\,\text{Sec}[c+dx]^{3/2}}\,dx$$

Optimal (type 4, 222 leaves, 9 steps):

$$-\frac{(A+9B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{10a^3d}+\frac{(A+3B)\sqrt{\text{Cos}[c+dx]}\ \text{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\text{Sec}[c+dx]}}{6a^3d}-\frac{(A-B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{5d\,(a+a\,\text{Sec}[c+dx])^3}+\frac{(2A+3B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{15ad\,(a+a\,\text{Sec}[c+dx])^2}+\frac{(A+3B)\sqrt{\text{Sec}[c+dx]}\ \text{Sin}[c+dx]}{6d\,(a^3+a^3\,\text{Sec}[c+dx])}$$

Result (type 5, 773 leaves):

$$-\left(\left(\left(\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2\,i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.\right.\right.$$
$$\left(1+e^{2\,i\,(c+dx)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+dx)}\right]\right)$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)\Bigg)-$$
$$\left(9\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2\,i\,(c+dx)}}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\text{Csc}\left[\frac{c}{2}\right]\right.$$
$$\left(1+e^{2\,i\,(c+dx)}+\left(-1+e^{2\,i\,c}\right)\sqrt{1+e^{2\,i\,(c+dx)}}\,\text{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2\,i\,(c+dx)}\right]\right)$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)+$$
$$\left(2\,A\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\right.$$
$$\left.\text{Sec}\left[\frac{c}{2}\right]\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c]\right)\Big/\left(3\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)+$$
$$\left(2\,B\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}\left[\frac{c}{2}\right]\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\text{Sec}\left[\frac{c}{2}\right]\right.$$
$$\left.\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c]\right)\Big/\left(d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^3\right)+\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\text{Sec}[c+d\,x]}\right.$$
$$\left(\frac{2\,(A+9\,B)\,\text{Cos}[d\,x]\,\text{Csc}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}\right]}{5\,d}-\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(7\,A\,\text{Sin}\left[\frac{dx}{2}\right]-12\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{15\,d}+\right.$$
$$\frac{4\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-9\,B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}+$$
$$\frac{2\,\text{Sec}\left[\frac{c}{2}\right]\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{5\,d}+\frac{4\,(A-9\,B)\,\text{Tan}\left[\frac{c}{2}\right]}{3\,d}-$$
$$\left.\left.\frac{4\,(7\,A-12\,B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\text{Tan}\left[\frac{c}{2}\right]}{15\,d}+\frac{2\,(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\text{Tan}\left[\frac{c}{2}\right]}{5\,d}\right)\right)\Big/\left(a+a\,\text{Cos}[c+d\,x]\right)^3$$

Problem 491: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\left(a+a\,\text{Cos}[c+d\,x]\right)^3\,\text{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 4, 228 leaves, 9 steps):

$$-\frac{(9\,A-49\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{10\,a^3\,d}+\frac{(3\,A-13\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{6\,a^3\,d}+\frac{(A-B)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{5\,d\,(a+a\,\text{Sec}[c+d\,x])^3}+\frac{(3\,A-8\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{15\,a\,d\,(a+a\,\text{Sec}[c+d\,x])^2}+\frac{(3\,A-13\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{6\,d\,\left(a^3+a^3\,\text{Sec}[c+d\,x]\right)}$$

Result (type 5, 797 leaves):

$$-\left(\left(9\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.\right.$$

$$\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)$$

$$\left.\left.\mathrm{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\,(a+a\,\mathrm{Cos}[c+dx])^3\right)\right)+$$

$$\left(49\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\right.$$

$$\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\,(a+a\,\mathrm{Cos}[c+dx])^3\right)+$$

$$\left(2\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\right.$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c]\right)\Big/\left(d\,(a+a\,\mathrm{Cos}[c+dx])^3\right)-$$

$$\left(26\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\right.$$

$$\left.\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c]\right)\Big/\left(3d\,(a+a\,\mathrm{Cos}[c+dx])^3\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Sec}[c+dx]}\,\left(-\frac{2\,(-9A+39B+10B\,\mathrm{Cos}[2c])\,\mathrm{Cos}[dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]}{5d}-\right.\right.$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(9A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-23B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(12A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-17B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{15d}-$$

$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+\frac{16\,B\,\mathrm{Cos}[c]\,\mathrm{Sin}[dx]}{d}-$$

$$\frac{4\,(9A-23B)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3d}+\frac{4\,(12A-17B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15d}-$$

$$\left.\left.\frac{2\,(A-B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5d}\right)\right)\Big/\left(a+a\,\mathrm{Cos}[c+dx]\right)^3$$

Problem 492: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Cos}[c + d x]}{\left(a + a \operatorname{Cos}[c + d x]\right)^3 \operatorname{Sec}[c + d x]^{7/2}} \, dx$$

Optimal (type 4, 259 leaves, 10 steps):

$$\frac{7 \left(7 A - 17 B\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} \left(c + d x\right), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{10 a^3 d} - \frac{\left(13 A - 33 B\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} \left(c + d x\right), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{6 a^3 d} - \frac{\left(13 A - 33 B\right) \operatorname{Sin}[c + d x]}{6 a^3 d \sqrt{\operatorname{Sec}[c + d x]}} + \frac{(A - B) \operatorname{Sin}[c + d x]}{5 d \sqrt{\operatorname{Sec}[c + d x]} \left(a + a \operatorname{Sec}[c + d x]\right)^3} + \frac{\left(A - 2 B\right) \operatorname{Sin}[c + d x]}{3 a d \sqrt{\operatorname{Sec}[c + d x]} \left(a + a \operatorname{Sec}[c + d x]\right)^2} + \frac{7 \left(7 A - 17 B\right) \operatorname{Sin}[c + d x]}{30 d \sqrt{\operatorname{Sec}[c + d x]} \left(a^3 + a^3 \operatorname{Sec}[c + d x]\right)}$$

Result (type 5, 842 leaves):

$$\left(49\sqrt{2}\,A\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)-$$

$$\left(119\sqrt{2}\,B\,e^{-i\,(2c+dx)}\sqrt{\frac{e^{i\,(c+dx)}}{1+e^{2i\,(c+dx)}}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\mathrm{Csc}\left[\frac{c}{2}\right]\left(1+e^{2i\,(c+dx)}+\left(-1+e^{2ic}\right)\sqrt{1+e^{2i\,(c+dx)}}\,\mathrm{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},-e^{2i\,(c+dx)}\right]\right)\mathrm{Sec}\left[\frac{c}{2}\right]\right)\Big/\left(5d\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)-$$

$$\left(26\,A\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c]\right)\Big/\left(3d\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)+$$

$$\left(22\,B\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\mathrm{Sec}\left[\frac{c}{2}\right]\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c]\right)\Big/\left(d\left(a+a\,\mathrm{Cos}[c+dx]\right)^3\right)+$$

$$\frac{1}{\left(a+a\,\mathrm{Cos}[c+dx]\right)^3}\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\sqrt{\mathrm{Sec}[c+dx]}$$

$$\left(-\frac{1}{5d}2\left(39A-89B+10A\,\mathrm{Cos}[2c]-30B\,\mathrm{Cos}[2c]\right)\mathrm{Cos}[dx]\,\mathrm{Csc}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}\right]+\right.$$

$$\frac{8B\,\mathrm{Cos}[2dx]\,\mathrm{Sin}[2c]}{3d}+\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\left(23A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-43B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{3d}-$$

$$\frac{4\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\left(17A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-22B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{15d}+$$

$$\frac{2\,\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\left(A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{5d}+$$

$$\frac{16\,(A-3B)\,\mathrm{Cos}[c]\,\mathrm{Sin}[dx]}{d}+\frac{8B\,\mathrm{Cos}[2c]\,\mathrm{Sin}[2dx]}{3d}+\frac{4\,(23A-43B)\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3d}-$$

$$\left.\frac{4\,(17A-22B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\mathrm{Tan}\left[\frac{c}{2}\right]}{15d}+\frac{2\,(A-B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\mathrm{Tan}\left[\frac{c}{2}\right]}{5d}\right)$$

Problem 497: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{a + a \operatorname{Cos}[c + d x]} \, (A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{3/2} \, dx$$

Optimal (type 3, 96 leaves, 4 steps):

$$\frac{2 \sqrt{a} \, B \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \, \sqrt{\operatorname{Sec}[c + d x]}}{d} + \frac{2 a A \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d \sqrt{a + a \operatorname{Cos}[c + d x]}}$$

Result (type 3, 299 leaves):

$$\frac{1}{d \sqrt{\left(1 + e^{2 i d x}\right) \operatorname{Cos}[c] + i \left(-1 + e^{2 i d x}\right) \operatorname{Sin}[c]}}$$
$$\sqrt{a \left(1 + \operatorname{Cos}[c + d x]\right)} \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right] \sqrt{\operatorname{Sec}[c + d x]} \left(\operatorname{Cos}\left[\frac{d x}{2}\right] + i \operatorname{Sin}\left[\frac{d x}{2}\right]\right)$$
$$\left(i B \operatorname{ArcTanh}\left[\left(\operatorname{Cos}\left[\frac{c}{2}\right] + i \operatorname{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1 + e^{2 i d x}\right) \operatorname{Cos}[c] + i \left(-1 + e^{2 i d x}\right) \operatorname{Sin}[c]}\right] \operatorname{Cos}[c + d x] - \right.$$
$$i B \operatorname{Cos}[c + d x]$$
$$\operatorname{Log}\left[2 \left(e^{i d x} \operatorname{Cos}\left[\frac{c}{2}\right] + i e^{i d x} \operatorname{Sin}\left[\frac{c}{2}\right] + \sqrt{\left(1 + e^{2 i d x}\right) \operatorname{Cos}[c] + i \left(-1 + e^{2 i d x}\right) \operatorname{Sin}[c]}\right)\right] +$$
$$\left. 2 \sqrt{2} \, A \left(\operatorname{Cos}\left[\frac{d x}{2}\right] - i \operatorname{Sin}\left[\frac{d x}{2}\right]\right) \sqrt{\operatorname{Cos}[c + d x] \left(\operatorname{Cos}[d x] + i \operatorname{Sin}[d x]\right)} \operatorname{Sin}\left[\frac{1}{2} (c + d x)\right]\right)$$

Problem 498: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \sqrt{a + a \operatorname{Cos}[c + d x]} \, (A + B \operatorname{Cos}[c + d x]) \sqrt{\operatorname{Sec}[c + d x]} \, dx$$

Optimal (type 3, 98 leaves, 4 steps):

$$\frac{\sqrt{a} \, (2 A + B) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \, \sqrt{\operatorname{Sec}[c + d x]}}{d} +$$
$$\frac{a B \operatorname{Sin}[c + d x]}{d \sqrt{a + a \operatorname{Cos}[c + d x]} \, \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 3, 442 leaves):

$$\frac{1}{2\sqrt{2}\, d\sqrt{\text{Sec}[c+d x]}\,\sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i\,\text{Sin}[d x])}}$$

$$\sqrt{a\,(1+\text{Cos}[c+d x])}\;\text{Sec}\Big[\frac{1}{2}\,(c+d x)\Big]\,\Big(-i\,(2 A+B)\,\text{Cos}\Big[\frac{d x}{2}\Big]$$

$$\text{Log}\Big[2\,\Big(e^{i d x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i d x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\Big)\Big]+$$

$$i\,(2 A+B)\,\text{ArcTanh}\Big[\Big(\text{Cos}\Big[\frac{c}{2}\Big]+i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\Big]$$

$$\Big(\text{Cos}\Big[\frac{d x}{2}\Big]+i\,\text{Sin}\Big[\frac{d x}{2}\Big]\Big)+2 A\,\text{Log}\Big[$$

$$2\,\Big(e^{i d x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i d x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\Big)\Big]\,\text{Sin}\Big[\frac{d x}{2}\Big]+$$

$$B\,\text{Log}\Big[2\,\Big(e^{i d x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i d x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{\left(1+e^{2 i d x}\right)\text{Cos}[c]+i\left(-1+e^{2 i d x}\right)\text{Sin}[c]}\Big)\Big]$$

$$\text{Sin}\Big[\frac{d x}{2}\Big]+2\sqrt{2}\,B\sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i\,\text{Sin}[d x])}\;\text{Sin}\Big[\frac{1}{2}\,(c+d x)\Big]\Big)$$

Problem 499: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{a+a\,\text{Cos}[c+d x]}\,(A+B\,\text{Cos}[c+d x])}{\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 151 leaves, 5 steps):

$$\frac{\sqrt{a}\,(4 A+3 B)\,\text{ArcSin}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\Big]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{4 d}+$$

$$\frac{a B\,\text{Sin}[c+d x]}{2 d\sqrt{a+a\,\text{Cos}[c+d x]}\;\text{Sec}[c+d x]^{3/2}}+\frac{a\,(4 A+3 B)\,\text{Sin}[c+d x]}{4 d\sqrt{a+a\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}$$

Result (type 3, 531 leaves):

$$\frac{1}{8\sqrt{2}\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{\mathrm{Cos}[c+d\,x]\,(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x])}}\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]\left(-i\,(4\,A+3\,B)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\mathrm{Log}\left[2\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\mathrm{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\mathrm{Sin}[c]}\right)\right]+$$
$$i\,(4\,A+3\,B)\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{(1+e^{2\,i\,d\,x})\,\mathrm{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\mathrm{Sin}[c]}\right]$$
$$\left(\mathrm{Cos}\left[\frac{d\,x}{2}\right]+i\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)+4\,A\,\mathrm{Log}\Big[$$
$$2\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\mathrm{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\mathrm{Sin}[c]}\right)\Big]\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+$$
$$3\,B\,\mathrm{Log}\left[2\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\mathrm{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\mathrm{Sin}[c]}\right)\right]$$
$$\mathrm{Sin}\left[\frac{d\,x}{2}\right]+8\sqrt{2}\,A\sqrt{\mathrm{Cos}[c+d\,x]\,(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x])}\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$4\sqrt{2}\,B\sqrt{\mathrm{Cos}[c+d\,x]\,(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x])}\,\mathrm{Sin}\left[\frac{1}{2}(c+d\,x)\right]+$$
$$\left.2\sqrt{2}\,B\sqrt{\mathrm{Cos}[c+d\,x]\,(\mathrm{Cos}[d\,x]+i\,\mathrm{Sin}[d\,x])}\,\mathrm{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)$$

Problem 500: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,(A+B\,\mathrm{Cos}[c+d\,x])}{\mathrm{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 196 leaves, 6 steps):

$$\frac{\sqrt{a}\,(6\,A+5\,B)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{8\,d}+$$
$$\frac{a\,B\,\mathrm{Sin}[c+d\,x]}{3\,d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{a\,(6\,A+5\,B)\,\mathrm{Sin}[c+d\,x]}{12\,d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{a\,(6\,A+5\,B)\,\mathrm{Sin}[c+d\,x]}{8\,d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 3, 615 leaves):

$$\frac{1}{48\sqrt{2}\,d\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+\mathrm{i}\,\text{Sin}[d\,x]\right)}}$$
$$\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\,\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\,\left(-3\,\mathrm{i}\,\left(6\,A+5\,B\right)\,\text{Cos}\left[\frac{d\,x}{2}\right]\right.$$
$$\text{Log}\left[2\,\left(e^{\mathrm{i}\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\,e^{\mathrm{i}\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\,\text{Cos}[c]+\mathrm{i}\,\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$
$$3\,\mathrm{i}\,\left(6\,A+5\,B\right)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\,\text{Cos}[c]+\mathrm{i}\,\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\,\text{Sin}[c]}\right]$$
$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]+\mathrm{i}\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+18\,A\,\text{Log}\Big[$$
$$2\,\left(e^{\mathrm{i}\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\,e^{\mathrm{i}\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\,\text{Cos}[c]+\mathrm{i}\,\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\,\text{Sin}[c]}\right)\Big]\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$15\,B\,\text{Log}\left[2\,\left(e^{\mathrm{i}\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\,e^{\mathrm{i}\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\,\text{Cos}[c]+\mathrm{i}\,\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{d\,x}{2}\right]+24\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+\mathrm{i}\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$
$$28\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+\mathrm{i}\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+$$
$$12\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+\mathrm{i}\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]+$$
$$6\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+\mathrm{i}\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]+$$
$$\left.4\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+\mathrm{i}\,\text{Sin}[d\,x]\right)}\,\,\text{Sin}\left[\frac{5}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 505: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 3, 145 leaves, 5 steps):

$$\frac{2\,a^{3/2}\,B\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}}{d}+$$
$$\frac{2\,a^2\,\left(4\,A+3\,B\right)\,\sqrt{\text{Sec}[c+d\,x]}\,\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 3, 774 leaves):

$$\frac{1}{12\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]}}$$
$$\left(a\,\left(1+Cos[c+d\,x]\right)\right)^{3/2}\,Sec\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3\,\sqrt{Sec[c+d\,x]}$$
$$\left(3\,B\,e^{-\frac{1}{2}\,i\,d\,x}\,ArcTanh\left[\left(Cos\left[\frac{c}{2}\right]+i\,Sin\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]}\,\right]\right.$$
$$Cos\left[\frac{c}{2}\right]^2\,\left(i\,\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]-\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]\right)+$$
$$3\,B\,e^{-\frac{1}{2}\,i\,d\,x}\,ArcTanh\left[\left(Cos\left[\frac{c}{2}\right]+i\,Sin\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]}\,\right]$$
$$Sin\left[\frac{c}{2}\right]^2\,\left(i\,\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]-\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]\right)-3\,i\,B\,e^{-\frac{1}{2}\,i\,d\,x}\,Cos\left[\frac{c}{2}\right]^2$$
$$Log\left[2\,\left(e^{i\,d\,x}\,Cos\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,Sin\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]}\,\right)\right]$$
$$\left(\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]\right)-3\,i\,B\,e^{-\frac{1}{2}\,i\,d\,x}$$
$$Log\left[2\,\left(e^{i\,d\,x}\,Cos\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,Sin\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]}\,\right)\right]$$
$$Sin\left[\frac{c}{2}\right]^2\,\left(\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]\right)+$$
$$20\,A\,Cos\left[\frac{c}{2}\right]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]}\,\,Sin\left[\frac{d\,x}{2}\right]+$$
$$12\,B\,Cos\left[\frac{c}{2}\right]\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,Cos[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,Sin[c]}\,\,Sin\left[\frac{d\,x}{2}\right]+$$
$$20\,\sqrt{2}\,\,A\,Cos\left[\frac{d\,x}{2}\right]\,Sin\left[\frac{c}{2}\right]\,\sqrt{Cos[c+d\,x]\,\left(Cos[d\,x]+i\,Sin[d\,x]\right)}\,+$$
$$12\,\sqrt{2}\,\,B\,Cos\left[\frac{d\,x}{2}\right]\,Sin\left[\frac{c}{2}\right]\,\sqrt{Cos[c+d\,x]\,\left(Cos[d\,x]+i\,Sin[d\,x]\right)}\,+$$
$$\left.4\,\sqrt{2}\,\,A\,Sec[c+d\,x]\,\sqrt{Cos[c+d\,x]\,\left(Cos[d\,x]+i\,Sin[d\,x]\right)}\,\,Sin\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right)$$

Problem 506: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,Cos[c+d\,x]\right)^{3/2}\,\left(A+B\,Cos[c+d\,x]\right)\,Sec[c+d\,x]^{3/2}\,dx$$

Optimal (type 3, 146 leaves, 5 steps):

$$\frac{a^{3/2}\,\left(2\,A+3\,B\right)\,ArcSin\left[\frac{\sqrt{a}\,\,Sin[c+d\,x]}{\sqrt{a+a\,Cos[c+d\,x]}}\right]\,\sqrt{Cos[c+d\,x]}\,\,\sqrt{Sec[c+d\,x]}}{d}-$$
$$\frac{a^2\,\left(2\,A-B\right)\,Sin[c+d\,x]}{d\,\sqrt{a+a\,Cos[c+d\,x]}\,\,\sqrt{Sec[c+d\,x]}}+\frac{2\,a\,A\,\sqrt{a+a\,Cos[c+d\,x]}\,\,\sqrt{Sec[c+d\,x]}\,\,Sin[c+d\,x]}{d}$$

Result (type 3, 885 leaves):

$$\frac{1}{4\,d\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}}$$

$$a\,\sqrt{a\,\left(1+\text{Cos}[c+d\,x]\right)}\;\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\,\sqrt{\text{Sec}[c+d\,x]}\;\left(-i\,(2\,A+3\,B)\,\text{Cos}\left[c+\frac{d\,x}{2}\right]\right.$$

$$\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]-$$

$$2\,i\,A\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\right.\right.$$

$$\left.\left.\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]-3\,i\,B\,\text{Cos}\left[c+\frac{3\,d\,x}{2}\right]$$

$$\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]+$$

$$2\,i\,(2\,A+3\,B)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]$$

$$\text{Cos}[c+d\,x]\,\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)-$$

$$2\,A\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\text{Sin}\left[c+\frac{d\,x}{2}\right]-$$

$$3\,B\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\text{Sin}\left[c+\frac{d\,x}{2}\right]+8\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\;\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$2\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\;\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$2\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,\left(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x]\right)}\;\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]+$$

$$2\,A\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]+$$

$$3\,B\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right]$$

$$\left.\text{Sin}\left[c+\frac{3\,d\,x}{2}\right]\right)$$

Problem 507: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\,dx$$

Optimal (type 3, 153 leaves, 5 steps):

$$\frac{a^{3/2}\,(12\,A+7\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{4\,d}+\frac{a^2\,(4\,A+5\,B)\,\text{Sin}[c+d\,x]}{4\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a\,B\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 532 leaves):

$$\frac{1}{8\,\sqrt{2}\,d\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}}\,a\,\sqrt{a\,(1+\text{Cos}[c+d\,x])}\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]\Bigg(-i\,(12\,A+7\,B)\,\text{Cos}\left[\frac{d\,x}{2}\right]$$
$$\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right)\right]+$$
$$i\,(12\,A+7\,B)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right]$$
$$\left(\text{Cos}\left[\frac{d\,x}{2}\right]+i\,\text{Sin}\left[\frac{d\,x}{2}\right]\right)+12\,A\,\text{Log}\Big[$$
$$2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right)\Big]\,\text{Sin}\left[\frac{d\,x}{2}\right]+$$
$$7\,B\,\text{Log}\left[2\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{d\,x}{2}\right]+8\,\sqrt{2}\,A\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$12\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d\,x)\right]+$$
$$2\,\sqrt{2}\,B\,\sqrt{\text{Cos}[c+d\,x]\,(\text{Cos}[d\,x]+i\,\text{Sin}[d\,x])}\,\text{Sin}\left[\frac{3}{2}\,(c+d\,x)\right]\Bigg)$$

Problem 508: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x])}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 200 leaves, 6 steps):

$$\frac{a^{3/2}\,(14\,A+11\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}{8\,d}+\frac{a^2\,(6\,A+7\,B)\,\text{Sin}[c+d\,x]}{12\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+$$
$$\frac{a\,B\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{3\,d\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^2\,(14\,A+11\,B)\,\text{Sin}[c+d\,x]}{8\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 616 leaves):

$$\frac{1}{48\sqrt{2}\,d\sqrt{\text{Sec}[c+d x]}\,\sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i\,\text{Sin}[d x])}}$$
$$a\sqrt{a\,(1+\text{Cos}[c+d x])}\,\text{Sec}\left[\frac{1}{2}\,(c+d x)\right]\,\Bigg(-3\,i\,(14\,A+11\,B)\,\text{Cos}\left[\frac{d x}{2}\right]$$
$$\text{Log}\left[2\left(e^{i d x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\text{Sin}[c]}\right)\right]+$$
$$3\,i\,(14\,A+11\,B)\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\sqrt{(1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\text{Sin}[c]}\right]$$
$$\left(\text{Cos}\left[\frac{d x}{2}\right]+i\,\text{Sin}\left[\frac{d x}{2}\right]\right)+42\,A\,\text{Log}\Big[$$
$$2\left(e^{i d x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\text{Sin}[c]}\right)\Big]\,\text{Sin}\left[\frac{d x}{2}\right]+$$
$$33\,B\,\text{Log}\left[2\left(e^{i d x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\,\text{Sin}\left[\frac{c}{2}\right]+\sqrt{(1+e^{2 i d x})\,\text{Cos}[c]+i\,(-1+e^{2 i d x})\,\text{Sin}[c]}\right)\right]$$
$$\text{Sin}\left[\frac{d x}{2}\right]+72\sqrt{2}\,A\sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i\,\text{Sin}[d x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d x)\right]+$$
$$52\sqrt{2}\,B\sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i\,\text{Sin}[d x])}\,\text{Sin}\left[\frac{1}{2}\,(c+d x)\right]+$$
$$12\sqrt{2}\,A\sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i\,\text{Sin}[d x])}\,\text{Sin}\left[\frac{3}{2}\,(c+d x)\right]+$$
$$18\sqrt{2}\,B\sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i\,\text{Sin}[d x])}\,\text{Sin}\left[\frac{3}{2}\,(c+d x)\right]+$$
$$4\sqrt{2}\,B\sqrt{\text{Cos}[c+d x]\,(\text{Cos}[d x]+i\,\text{Sin}[d x])}\,\text{Sin}\left[\frac{5}{2}\,(c+d x)\right]\Bigg)$$

Problem 509: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(a+a\,\text{Cos}[c+d x])^{3/2}\,(A+B\,\text{Cos}[c+d x])}{\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 3, 247 leaves, 7 steps):

$$\frac{a^{3/2}\,(88\,A+75\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{64\,d}+$$
$$\frac{a^2\,(8\,A+9\,B)\,\text{Sin}[c+d x]}{24\,d\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]^{5/2}}+\frac{a\,B\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{4\,d\,\text{Sec}[c+d x]^{5/2}}+$$
$$\frac{a^2\,(88\,A+75\,B)\,\text{Sin}[c+d x]}{96\,d\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]^{3/2}}+\frac{a^2\,(88\,A+75\,B)\,\text{Sin}[c+d x]}{64\,d\sqrt{a+a\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}$$

Result (type 3, 371 leaves):

$$-\frac{1}{768\,d\,\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}}\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{3/2}\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3\sqrt{\mathrm{Sec}[c+d\,x]}\left(-\frac{1}{\sqrt{2}}3\,i\left(88\,A+75\,B\right)e^{-\frac{1}{2}\,i\,d\,x}\right.$$
$$\left(\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right]-\right.$$
$$\left.\mathrm{Log}\left[2\left(e^{i\,d\,x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\right)\right]\right)$$
$$\left(\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]\right)+\left(296\,A+285\,B+\right.$$
$$\left.2\left(88\,A+93\,B\right)\mathrm{Cos}[c+d\,x]+4\left(8\,A+15\,B\right)\mathrm{Cos}\left[2\left(c+d\,x\right)\right]+12\,B\,\mathrm{Cos}\left[3\left(c+d\,x\right)\right]\right)$$
$$\left.\sqrt{2\left(1+e^{2\,i\,d\,x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2\,i\,d\,x}\right)\mathrm{Sin}[c]}\left(\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]-\mathrm{Sin}\left[\frac{3}{2}\left(c+d\,x\right)\right]\right)\right)$$

Problem 514: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\left(A+B\,\mathrm{Cos}[c+d\,x]\right)\mathrm{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 3, 192 leaves, 6 steps):

$$\frac{2\,a^{5/2}\,B\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{d}+$$
$$\frac{2\,a^3\left(32\,A+35\,B\right)\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{15\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}+$$
$$\frac{2\,a^2\left(8\,A+5\,B\right)\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\mathrm{Sec}[c+d\,x]^{3/2}\,\mathrm{Sin}[c+d\,x]}{15\,d}+$$
$$\frac{2\,a\,A\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\mathrm{Sec}[c+d\,x]^{5/2}\,\mathrm{Sin}[c+d\,x]}{5\,d}$$

Result (type 3, 946 leaves):

$$\frac{1}{4} B \sqrt{\text{Cos}[c+d x]} \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \sqrt{\text{Sec}[c+d x]} \left(\frac{1}{2} i \text{Sin}\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \text{Log}\left[2 \left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right] \left(\text{Cos}\left[\frac{c}{2}\right]-i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right) - \left(2 i e^{\frac{i d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right] \left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right) + \frac{1}{2} \text{Cos}\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \text{Log}\left[2 \left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right] \left(\text{Cos}\left[\frac{c}{2}\right]-i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right) + \left(2 i e^{\frac{i d x}{2}} \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right] \left(\text{Cos}\left[\frac{c}{2}\right]+i \text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} \left(\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]\right)}\right) \Big/ \left(d \sqrt{2 \left(1+e^{2 i d x}\right) \text{Cos}[c]+2 i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right)\right) +$$

$$\left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2} \text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \sqrt{\text{Sec}[c+d x]} \left(\frac{(43 A+40 B) \text{Cos}\left[\frac{d x}{2}\right] \text{Sin}\left[\frac{c}{2}\right]}{30 d}+\frac{(43 A+40 B) \text{Cos}\left[\frac{c}{2}\right] \text{Sin}\left[\frac{d x}{2}\right]}{30 d}+\frac{A \text{Sec}[c+d x]^2 \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]}{10 d}+\frac{\text{Sec}[c+d x] \left(14 A \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]+5 B \text{Sin}\left[\frac{c}{2}+\frac{d x}{2}\right]\right)}{30 d}\right)$$

Problem 515: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a + a \operatorname{Cos}[c + d x])^{5/2} (A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{5/2} \, dx$$

Optimal (type 3, 193 leaves, 6 steps):

$$\frac{a^{5/2} (2 A + 5 B) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}{d} - \frac{a^3 (14 A + 3 B) \operatorname{Sin}[c + d x]}{3 d \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}} + \frac{2 a^2 (2 A + B) \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{d} + \frac{2 a A (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{3 d}$$

Result (type 3, 946 leaves):

$$\frac{1}{8}\,(2\,A+5\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}$$

$$\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5\sqrt{\text{Sec}[c+d\,x]}\,\,\Big(\frac{1}{2}\,i\,\text{Sin}\Big[\frac{c}{2}\Big]\,\Big(-\Big(\Big(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\Big[$$

$$2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\Big)\Big]$$

$$\Big(\text{Cos}\Big[\frac{c}{2}\Big]-i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{e^{-i\,d\,x}\,\big((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\big)}\,\Big)\Big/$$

$$\Big(d\,\sqrt{2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\Big)\Big)-$$

$$\Big(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\Big[\Big(\text{Cos}\Big[\frac{c}{2}\Big]+i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\Big]$$

$$\Big(\text{Cos}\Big[\frac{c}{2}\Big]+i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{e^{-i\,d\,x}\,\big((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\big)}\,\Big)\Big/$$

$$\Big(d\,\sqrt{2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\Big)\Big)+$$

$$\frac{1}{2}\,\text{Cos}\Big[\frac{c}{2}\Big]\,\Big(-\Big(\Big(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\Big[2\,\Big(e^{i\,d\,x}\,\text{Cos}\Big[\frac{c}{2}\Big]+i\,e^{i\,d\,x}\,\text{Sin}\Big[\frac{c}{2}\Big]+$$

$$\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\Big)\Big]$$

$$\Big(\text{Cos}\Big[\frac{c}{2}\Big]-i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{e^{-i\,d\,x}\,\big((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\big)}\,\Big)\Big/$$

$$\Big(d\,\sqrt{2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\Big)\Big)+$$

$$\Big(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\Big[\Big(\text{Cos}\Big[\frac{c}{2}\Big]+i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\Big]$$

$$\Big(\text{Cos}\Big[\frac{c}{2}\Big]+i\,\text{Sin}\Big[\frac{c}{2}\Big]\Big)\,\sqrt{e^{-i\,d\,x}\,\big((1+e^{2\,i\,d\,x})\,\text{Cos}[c]+i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]\big)}\,\Big)\Big/$$

$$\Big(d\,\sqrt{2\,(1+e^{2\,i\,d\,x})\,\text{Cos}[c]+2\,i\,(-1+e^{2\,i\,d\,x})\,\text{Sin}[c]}\,\Big)\Big)\Big)+$$

$$(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\,\text{Sec}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^5$$

$$\sqrt{\text{Sec}[c+d\,x]}$$

$$\Big(\frac{(32\,A+9\,B)\,\text{Cos}\big[\frac{d\,x}{2}\big]\,\text{Sin}\big[\frac{c}{2}\big]}{24\,d}+$$

$$\frac{B\,\text{Cos}\big[\frac{3\,d\,x}{2}\big]\,\text{Sin}\big[\frac{3\,c}{2}\big]}{8\,d}+$$

$$\frac{(32\,A+9\,B)\,\text{Cos}\big[\frac{c}{2}\big]\,\text{Sin}\big[\frac{d\,x}{2}\big]}{24\,d}+$$

$$\frac{B\,\text{Cos}\big[\frac{3\,c}{2}\big]\,\text{Sin}\big[\frac{3\,d\,x}{2}\big]}{8\,d}+$$

$$\frac{A\,\text{Sec}[c+d\,x]\,\text{Sin}\big[\frac{c}{2}+\frac{d\,x}{2}\big]}{6\,d}\Big)$$

Problem 516: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (a + a \cos[c + d x])^{5/2} (A + B \cos[c + d x]) \sec[c + d x]^{3/2} \, dx$$

Optimal (type 3, 198 leaves, 6 steps):

$$\frac{a^{5/2} (20 A + 19 B) \operatorname{ArcSin}\left[\frac{\sqrt{a} \sin[c+d x]}{\sqrt{a+a \cos[c+d x]}}\right] \sqrt{\cos[c + d x]} \sqrt{\sec[c + d x]}}{4 d} - \frac{a^3 (4 A - 9 B) \sin[c + d x]}{4 d \sqrt{a + a \cos[c + d x]} \sqrt{\sec[c + d x]}} - \frac{a^2 (4 A - B) \sqrt{a + a \cos[c + d x]} \sin[c + d x]}{2 d \sqrt{\sec[c + d x]}} + \frac{2 a A (a + a \cos[c + d x])^{3/2} \sqrt{\sec[c + d x]} \sin[c + d x]}{d}$$

Result (type 3, 973 leaves):

$$\frac{1}{32} (20 A + 19 B) \sqrt{\cos[c + d x]} (a (1 + \cos[c + d x]))^{5/2} \sec\left[\frac{c}{2} + \frac{d x}{2}\right]^5 \sqrt{\sec[c + d x]} \left(\frac{1}{2} i \sin\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \operatorname{Log}\left[2 \left(e^{i d x} \cos\left[\frac{c}{2}\right] + i e^{i d x} \sin\left[\frac{c}{2}\right] + \sqrt{(1 + e^{2 i d x}) \cos[c] + i (-1 + e^{2 i d x}) \sin[c]}\right)\right] \left(\cos\left[\frac{c}{2}\right] - i \sin\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} ((1 + e^{2 i d x}) \cos[c] + i (-1 + e^{2 i d x}) \sin[c])}\right) \Big/ \left(d \sqrt{2 (1 + e^{2 i d x}) \cos[c] + 2 i (-1 + e^{2 i d x}) \sin[c]}\right)\right) - \left(2 i e^{\frac{i d x}{2}} \operatorname{ArcTanh}\left[\left(\cos\left[\frac{c}{2}\right] + i \sin\left[\frac{c}{2}\right]\right) \sqrt{(1 + e^{2 i d x}) \cos[c] + i (-1 + e^{2 i d x}) \sin[c]}\right] \left(\cos\left[\frac{c}{2}\right] + i \sin\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} ((1 + e^{2 i d x}) \cos[c] + i (-1 + e^{2 i d x}) \sin[c])}\right) \Big/ \left(d \sqrt{2 (1 + e^{2 i d x}) \cos[c] + 2 i (-1 + e^{2 i d x}) \sin[c]}\right)\right) + \frac{1}{2} \cos\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \operatorname{Log}\left[2 \left(e^{i d x} \cos\left[\frac{c}{2}\right] + i e^{i d x} \sin\left[\frac{c}{2}\right] + \sqrt{(1 + e^{2 i d x}) \cos[c] + i (-1 + e^{2 i d x}) \sin[c]}\right)\right] \left(\cos\left[\frac{c}{2}\right] - i \sin\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} ((1 + e^{2 i d x}) \cos[c] + i (-1 + e^{2 i d x}) \sin[c])}\right) \Big/ \left(d \sqrt{2 (1 + e^{2 i d x}) \cos[c] + 2 i (-1 + e^{2 i d x}) \sin[c]}\right)\right) + \left(2 i e^{\frac{i d x}{2}} \operatorname{ArcTanh}\left[\left(\cos\left[\frac{c}{2}\right] + i \sin\left[\frac{c}{2}\right]\right) \sqrt{(1 + e^{2 i d x}) \cos[c] + i (-1 + e^{2 i d x}) \sin[c]}\right] \left(\cos\left[\frac{c}{2}\right] + i \sin\left[\frac{c}{2}\right]\right) \sqrt{e^{-i d x} ((1 + e^{2 i d x}) \cos[c] + i (-1 + e^{2 i d x}) \sin[c])}\right) \Big/ \left(d \sqrt{2 (1 + e^{2 i d x}) \cos[c] + 2 i (-1 + e^{2 i d x}) \sin[c]}\right)\right)\right) +$$

$$\left(a\left(1+\text{Cos}[c+d x]\right)\right)^{5/2}\,\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5\sqrt{\text{Sec}[c+d x]}\left(\frac{3\,(4 A-3 B)\,\text{Cos}\left[\frac{d x}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{32 d}+\frac{(2 A+5 B)\,\text{Cos}\left[\frac{3 d x}{2}\right]\text{Sin}\left[\frac{3 c}{2}\right]}{16 d}+\frac{B\,\text{Cos}\left[\frac{5 d x}{2}\right]\text{Sin}\left[\frac{5 c}{2}\right]}{32 d}+\frac{3\,(4 A-3 B)\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{d x}{2}\right]}{32 d}+\frac{(2 A+5 B)\,\text{Cos}\left[\frac{3 c}{2}\right]\text{Sin}\left[\frac{3 d x}{2}\right]}{16 d}+\frac{B\,\text{Cos}\left[\frac{5 c}{2}\right]\text{Sin}\left[\frac{5 d x}{2}\right]}{32 d}\right)$$

Problem 517: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\left(a+a\,\text{Cos}[c+d x]\right)^{5/2}\left(A+B\,\text{Cos}[c+d x]\right)\sqrt{\text{Sec}[c+d x]}\,dx$$

Optimal (type 3, 200 leaves, 6 steps):

$$\frac{a^{5/2}\,(38 A+25 B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}{8 d}+\frac{a^3\,(54 A+49 B)\,\text{Sin}[c+d x]}{24 d\,\sqrt{a+a\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}+\frac{a^2\,(2 A+3 B)\,\sqrt{a+a\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{4 d\,\sqrt{\text{Sec}[c+d x]}}+\frac{a B\,\left(a+a\,\text{Cos}[c+d x]\right)^{3/2}\,\text{Sin}[c+d x]}{3 d\,\sqrt{\text{Sec}[c+d x]}}$$

Result (type 3, 618 leaves):

$$\frac{1}{48 \sqrt{2}\, d \sqrt{\text{Sec}[c+d x]} \sqrt{\text{Cos}[c+d x] \left(\text{Cos}[d x]+i \,\text{Sin}[d x]\right)}}$$

$$a^2 \sqrt{a \left(1+\text{Cos}[c+d x]\right)}\, \text{Sec}\left[\frac{1}{2} (c+d x)\right] \left(-3 i \,(38 A+25 B)\, \text{Cos}\left[\frac{d x}{2}\right]\right.$$

$$\text{Log}\left[2 \left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right]+$$

$$3 i\, (38 A+25 B)\, \text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i \,\text{Sin}\left[\frac{c}{2}\right]\right) \sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right]$$

$$\left(\text{Cos}\left[\frac{d x}{2}\right]+i \,\text{Sin}\left[\frac{d x}{2}\right]\right)+114 A\, \text{Log}\Big[$$

$$2 \left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\Big] \text{Sin}\left[\frac{d x}{2}\right]+$$

$$75 B\, \text{Log}\left[2 \left(e^{i d x} \text{Cos}\left[\frac{c}{2}\right]+i e^{i d x} \text{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right) \text{Cos}[c]+i \left(-1+e^{2 i d x}\right) \text{Sin}[c]}\right)\right]$$

$$\text{Sin}\left[\frac{d x}{2}\right]+120 \sqrt{2}\, A \sqrt{\text{Cos}[c+d x] \left(\text{Cos}[d x]+i \,\text{Sin}[d x]\right)}\, \text{Sin}\left[\frac{1}{2} (c+d x)\right]+$$

$$124 \sqrt{2}\, B \sqrt{\text{Cos}[c+d x] \left(\text{Cos}[d x]+i \,\text{Sin}[d x]\right)}\, \text{Sin}\left[\frac{1}{2} (c+d x)\right]+$$

$$12 \sqrt{2}\, A \sqrt{\text{Cos}[c+d x] \left(\text{Cos}[d x]+i \,\text{Sin}[d x]\right)}\, \text{Sin}\left[\frac{3}{2} (c+d x)\right]+$$

$$30 \sqrt{2}\, B \sqrt{\text{Cos}[c+d x] \left(\text{Cos}[d x]+i \,\text{Sin}[d x]\right)}\, \text{Sin}\left[\frac{3}{2} (c+d x)\right]+$$

$$\left.4 \sqrt{2}\, B \sqrt{\text{Cos}[c+d x] \left(\text{Cos}[d x]+i \,\text{Sin}[d x]\right)}\, \text{Sin}\left[\frac{5}{2} (c+d x)\right]\right)$$

Problem 518: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\left(a+a \,\text{Cos}[c+d x]\right)^{5/2} \left(A+B \,\text{Cos}[c+d x]\right)}{\sqrt{\text{Sec}[c+d x]}}\, dx$$

Optimal (type 3, 247 leaves, 7 steps):

$$\frac{1}{64 d} a^{5/2} (200 A+163 B)\, \text{ArcSin}\left[\frac{\sqrt{a}\, \text{Sin}[c+d x]}{\sqrt{a+a \,\text{Cos}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}+$$

$$\frac{a^3 (104 A+95 B)\, \text{Sin}[c+d x]}{96 d \sqrt{a+a \,\text{Cos}[c+d x]}\, \text{Sec}[c+d x]^{3/2}}+\frac{a^2 (8 A+11 B) \sqrt{a+a \,\text{Cos}[c+d x]}\, \text{Sin}[c+d x]}{24 d\, \text{Sec}[c+d x]^{3/2}}+$$

$$\frac{a B \left(a+a \,\text{Cos}[c+d x]\right)^{3/2} \text{Sin}[c+d x]}{4 d\, \text{Sec}[c+d x]^{3/2}}+\frac{a^3 (200 A+163 B)\, \text{Sin}[c+d x]}{64 d \sqrt{a+a \,\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}$$

Result (type 3, 1081 leaves):

$$\frac{1}{512} (200 A+163 B) \sqrt{\text{Cos}[c+d x]} \left(a \left(1+\text{Cos}[c+d x]\right)\right)^{5/2}$$

$$\text{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \sqrt{\text{Sec}[c+d x]} \left(\frac{1}{2} i \,\text{Sin}\left[\frac{c}{2}\right] \left(-\left(\left(2 i e^{\frac{i d x}{2}} \text{Log}\Big[\right.\right.\right.\right.$$

$$2\left(e^{i d x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\sqrt{\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\right)\Big]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]-i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\right)\Bigg)-$$
$$\Bigg(2\,i\,e^{\frac{i d x}{2}}\,\mathrm{ArcTanh}\Big[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\Big]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\right)\Bigg)+$$
$$\frac{1}{2}\mathrm{Cos}\left[\frac{c}{2}\right]\Bigg(-\Bigg(\Bigg(2\,i\,e^{\frac{i d x}{2}}\,\mathrm{Log}\Big[2\left(e^{i d x}\,\mathrm{Cos}\left[\frac{c}{2}\right]+i\,e^{i d x}\,\mathrm{Sin}\left[\frac{c}{2}\right]+\right.$$
$$\left.\sqrt{\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\right)\Big]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]-i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\right)\Bigg)+$$
$$\Bigg(2\,i\,e^{\frac{i d x}{2}}\,\mathrm{ArcTanh}\Big[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\Big]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]+i\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-i d x}\left(\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2 i d x}\right)\mathrm{Cos}[c]+2\,i\left(-1+e^{2 i d x}\right)\mathrm{Sin}[c]}\right)\Bigg)\Bigg)+$$
$$\left(a\left(1+\mathrm{Cos}[c+d x]\right)\right)^{5/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5$$
$$\sqrt{\mathrm{Sec}[c+d x]}$$
$$\Bigg(-\frac{\left(376 A+265 B\right)\mathrm{Cos}\left[\frac{d x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{1536 d}+$$
$$\frac{\left(64 A+55 B\right)\mathrm{Cos}\left[\frac{3 d x}{2}\right]\mathrm{Sin}\left[\frac{3 c}{2}\right]}{192 d}+$$
$$\frac{\left(40 A+47 B\right)\mathrm{Cos}\left[\frac{5 d x}{2}\right]\mathrm{Sin}\left[\frac{5 c}{2}\right]}{512 d}+$$
$$\frac{\left(2 A+5 B\right)\mathrm{Cos}\left[\frac{7 d x}{2}\right]\mathrm{Sin}\left[\frac{7 c}{2}\right]}{192 d}+$$
$$\frac{B\,\mathrm{Cos}\left[\frac{9 d x}{2}\right]\mathrm{Sin}\left[\frac{9 c}{2}\right]}{256 d}-$$
$$\frac{\left(376 A+265 B\right)\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d x}{2}\right]}{1536 d}+$$
$$\frac{\left(64 A+55 B\right)\mathrm{Cos}\left[\frac{3 c}{2}\right]\mathrm{Sin}\left[\frac{3 d x}{2}\right]}{192 d}+$$

$$\frac{(40\,A+47\,B)\,\text{Cos}\left[\frac{5\,c}{2}\right]\,\text{Sin}\left[\frac{5\,d\,x}{2}\right]}{512\,d}+$$
$$\frac{(2\,A+5\,B)\,\text{Cos}\left[\frac{7\,c}{2}\right]\,\text{Sin}\left[\frac{7\,d\,x}{2}\right]}{192\,d}+$$
$$\left.\frac{B\,\text{Cos}\left[\frac{9\,c}{2}\right]\,\text{Sin}\left[\frac{9\,d\,x}{2}\right]}{256\,d}\right)$$

Problem 519: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+a\,\text{Cos}[c+d\,x])^{5/2}\,(A+B\,\text{Cos}[c+d\,x])}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 294 leaves, 8 steps):

$$\frac{1}{128\,d}a^{5/2}\,(326\,A+283\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{a^3\,(170\,A+157\,B)\,\text{Sin}[c+d\,x]}{240\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{a^2\,(10\,A+13\,B)\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{40\,d\,\text{Sec}[c+d\,x]^{5/2}}+\frac{a\,B\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{5\,d\,\text{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{a^3\,(326\,A+283\,B)\,\text{Sin}[c+d\,x]}{192\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{a^3\,(326\,A+283\,B)\,\text{Sin}[c+d\,x]}{128\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 1135 leaves):

$$\frac{1}{1024}\,(326\,A+283\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\left(a\,(1+\text{Cos}[c+d\,x])\right)^{5/2}$$
$$\text{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\sqrt{\text{Sec}[c+d\,x]}\,\left(\frac{1}{2}\,i\,\text{Sin}\left[\frac{c}{2}\right]\,\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\left[\right.\right.\right.\right.\right.$$
$$\left.2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]\right)+\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]-i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right)-$$
$$\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{ArcTanh}\left[\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]\right.$$
$$\left.\left(\text{Cos}\left[\frac{c}{2}\right]+i\,\text{Sin}\left[\frac{c}{2}\right]\right)\,\sqrt{e^{-i\,d\,x}\,\left(\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]\right)}\right)\Big/$$
$$\left.\left(d\,\sqrt{2\,\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+2\,i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right)\right)+$$
$$\frac{1}{2}\,\text{Cos}\left[\frac{c}{2}\right]\,\left(-\left(\left(2\,i\,e^{\frac{i\,d\,x}{2}}\,\text{Log}\left[2\,\left(e^{i\,d\,x}\,\text{Cos}\left[\frac{c}{2}\right]+i\,e^{i\,d\,x}\,\text{Sin}\left[\frac{c}{2}\right]\right)+\right.\right.\right.\right.$$
$$\left.\sqrt{\left(1+e^{2\,i\,d\,x}\right)\,\text{Cos}[c]+i\,\left(-1+e^{2\,i\,d\,x}\right)\,\text{Sin}[c]}\right]$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]-\mathrm{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathrm{i}\,d\,x}\left(\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]}\right)\Bigg)+$$
$$\Bigg(2\,\mathrm{i}\,e^{\frac{\mathrm{i}\,d\,x}{2}}\,\mathrm{ArcTanh}\left[\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]}\right]$$
$$\left(\mathrm{Cos}\left[\frac{c}{2}\right]+\mathrm{i}\,\mathrm{Sin}\left[\frac{c}{2}\right]\right)\sqrt{e^{-\mathrm{i}\,d\,x}\left(\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]\right)}\Bigg/$$
$$\left(d\sqrt{2\left(1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Cos}[c]+2\,\mathrm{i}\left(-1+e^{2\,\mathrm{i}\,d\,x}\right)\mathrm{Sin}[c]}\right)\Bigg)\Bigg)+$$

$$\left(a\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5$$
$$\sqrt{\mathrm{Sec}[c+d\,x]}$$
$$\left(-\frac{(2650\,A+2309\,B)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{15\,360\,d}+\right.$$
$$\frac{(550\,A+509\,B)\,\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{3\,c}{2}\right]}{1920\,d}+$$
$$\frac{(94\,A+95\,B)\,\mathrm{Cos}\left[\frac{5\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{5\,c}{2}\right]}{1024\,d}+$$
$$\frac{(25\,A+32\,B)\,\mathrm{Cos}\left[\frac{7\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{7\,c}{2}\right]}{960\,d}+$$
$$\frac{(2\,A+5\,B)\,\mathrm{Cos}\left[\frac{9\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{9\,c}{2}\right]}{512\,d}+$$
$$\frac{B\,\mathrm{Cos}\left[\frac{11\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{11\,c}{2}\right]}{640\,d}-$$
$$\frac{(2650\,A+2309\,B)\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{15\,360\,d}+$$
$$\frac{(550\,A+509\,B)\,\mathrm{Cos}\left[\frac{3\,c}{2}\right]\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]}{1920\,d}+$$
$$\frac{(94\,A+95\,B)\,\mathrm{Cos}\left[\frac{5\,c}{2}\right]\mathrm{Sin}\left[\frac{5\,d\,x}{2}\right]}{1024\,d}+$$
$$\frac{(25\,A+32\,B)\,\mathrm{Cos}\left[\frac{7\,c}{2}\right]\mathrm{Sin}\left[\frac{7\,d\,x}{2}\right]}{960\,d}+$$
$$\frac{(2\,A+5\,B)\,\mathrm{Cos}\left[\frac{9\,c}{2}\right]\mathrm{Sin}\left[\frac{9\,d\,x}{2}\right]}{512\,d}+$$
$$\left.\frac{B\,\mathrm{Cos}\left[\frac{11\,c}{2}\right]\mathrm{Sin}\left[\frac{11\,d\,x}{2}\right]}{640\,d}\right)$$

Problem 520: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{11/2}}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 295 leaves, 9 steps):

$$-\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A-B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+\frac{2\,(257\,A-129\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{315\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{2\,(29\,A-93\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{315\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,(19\,A-3\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{105\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{2\,(A-9\,B)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{63\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,A\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 264 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(\frac{1}{d}2\,i\,(A-B)\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{1}{630\,d}\left(1279\,A-423\,B+(-214\,A+918\,B)\,\text{Cos}[c+d\,x]+8\,(157\,A-69\,B)\,\text{Cos}[2\,(c+d\,x)]-58\,A\,\text{Cos}[3\,(c+d\,x)]+186\,B\,\text{Cos}[3\,(c+d\,x)]+257\,A\,\text{Cos}[4\,(c+d\,x)]-129\,B\,\text{Cos}[4\,(c+d\,x)]\right)\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/\left(\sqrt{a\,(1+\text{Cos}[c+d\,x])}\right)$$

Problem 521: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{9/2}}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 250 leaves, 8 steps):

$$\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A-B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{2\,(43\,A-91\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{105\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,(31\,A-7\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{105\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{2\,(A-7\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{35\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+\frac{2\,A\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 242 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(-\frac{1}{d}2\, i\,(A-B)\, e^{-\frac{1}{2} i (c+d x)}\sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\right.\right.$$
$$\sqrt{1+e^{2 i (c+d x)}}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\right)-$$
$$\frac{1}{105\, d}\left(-122\, A+14\, B+3\,(47\, A-119\, B)\,\text{Cos}[c+d x]+(-62\, A+14\, B)\,\text{Cos}[2\,(c+d x)]+\right.$$
$$\left.43\, A\,\text{Cos}[3\,(c+d x)]-91\, B\,\text{Cos}[3\,(c+d x)]\right)$$
$$\left.\left.\text{Sec}[c+d x]^{7/2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(\sqrt{a\,(1+\text{Cos}[c+d x])}\right)$$

Problem 522: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{7/2}}{\sqrt{a+a\,\text{Cos}[c+d x]}}\, dx$$

Optimal (type 3, 207 leaves, 7 steps):

$$-\frac{1}{\sqrt{a}\, d}\sqrt{2}\,(A-B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{\text{Cos}[c+d x]}\sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}+$$
$$\frac{2\,(13\, A-5\, B)\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{15\, d\sqrt{a+a\,\text{Cos}[c+d x]}}-$$
$$\frac{2\,(A-5\, B)\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]}{15\, d\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2\, A\,\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{5\, d\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 215 leaves):

$$\left(2\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]\left(15\, i\,(A-B)\, e^{-\frac{1}{2} i (c+d x)}\sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\right.\right.$$
$$\sqrt{1+e^{2 i (c+d x)}}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\right)+$$
$$(19\, A-5\, B-2\,(A-5\, B)\,\text{Cos}[c+d x]+(13\, A-5\, B)\,\text{Cos}[2\,(c+d x)])$$
$$\left.\left.\text{Sec}[c+d x]^{5/2}\,\text{Sin}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(15\, d\sqrt{a\,(1+\text{Cos}[c+d x])}\right)$$

Problem 523: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{5/2}}{\sqrt{a+a\,\text{Cos}[c+d x]}}\, dx$$

Optimal (type 3, 162 leaves, 6 steps):

$$\frac{1}{\sqrt{a}\ d}\sqrt{2}\ (A-B)\ \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{2}\ \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}-\frac{2\,(A-3 B)\ \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{3\, d\,\sqrt{a+a\,\text{Cos}[c+d x]}}+\frac{2\, A\, \text{Sec}[c+d x]^{3/2}\ \text{Sin}[c+d x]}{3\, d\,\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 198 leaves):

$$-\left(\left(2\, i\, \text{Cos}\left[\frac{1}{2}\,(c+d x)\right]\left(3\,(A-B)\, e^{-\frac{1}{2} i\,(c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\ \sqrt{1+e^{2 i\,(c+d x)}}\ \left(\text{Log}\left[1+e^{i\,(c+d x)}\right]-\text{Log}\left[1-e^{i\,(c+d x)}+\sqrt{2}\ \sqrt{1+e^{2 i\,(c+d x)}}\right]\right)-2\, i\,\left(-A+(A-3 B)\ \text{Cos}[c+d x]\right)\ \text{Sec}[c+d x]^{3/2}\ \text{Sin}\left[\frac{1}{2}\,(c+d x)\right]\right)\right)\Big/\left(3\, d\,\sqrt{a\,(1+\text{Cos}[c+d x])}\right)\right)$$

Problem 524: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\text{Cos}[c+d x])\ \text{Sec}[c+d x]^{3/2}}{\sqrt{a+a\,\text{Cos}[c+d x]}}\, dx$$

Optimal (type 3, 119 leaves, 5 steps):

$$-\frac{1}{\sqrt{a}\ d}\sqrt{2}\ (A-B)\ \text{ArcTan}\left[\frac{\sqrt{a}\ \text{Sin}[c+d x]}{\sqrt{2}\ \sqrt{\text{Cos}[c+d x]}\ \sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}+\frac{2\, A\,\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{d\,\sqrt{a+a\,\text{Cos}[c+d x]}}$$

Result (type 3, 179 leaves):

$$\left(2\, \text{Cos}\left[\frac{1}{2}\,(c+d x)\right]\left(i\,(A-B)\, e^{-\frac{1}{2} i\,(c+d x)}\sqrt{\frac{e^{i\,(c+d x)}}{1+e^{2 i\,(c+d x)}}}\ \sqrt{1+e^{2 i\,(c+d x)}}\ \left(\text{Log}\left[1+e^{i\,(c+d x)}\right]-\text{Log}\left[1-e^{i\,(c+d x)}+\sqrt{2}\ \sqrt{1+e^{2 i\,(c+d x)}}\right]\right)+2\, A\,\sqrt{\text{Sec}[c+d x]}\ \text{Sin}\left[\frac{1}{2}\,(c+d x)\right]\right)\right)\Big/\left(d\,\sqrt{a\,(1+\text{Cos}[c+d x])}\right)$$

Problem 525: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\mathrm{Cos}[c+d\,x])\,\sqrt{\mathrm{Sec}[c+d\,x]}}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 3, 140 leaves, 6 steps):

$$\frac{2\,B\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{\sqrt{a}\,d}+\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A-B)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}$$

Result (type 3, 267 leaves):

$$\left(\sqrt{2}\,e^{-\frac{1}{2}i(c+d\,x)}\sqrt{\frac{e^{i(c+d\,x)}}{1+e^{2i(c+d\,x)}}}\,\sqrt{1+e^{2i(c+d\,x)}}\,\mathrm{Cos}\left[\frac{1}{2}(c+d\,x)\right]\left(B\,d\,x-i\,B\,\mathrm{ArcSinh}\left[e^{i(c+d\,x)}\right]-i\sqrt{2}\,(A-B)\,\mathrm{Log}\left[1+e^{i(c+d\,x)}\right]+i\,B\,\mathrm{Log}\left[1+\sqrt{1+e^{2i(c+d\,x)}}\right]+i\sqrt{2}\,A\,\mathrm{Log}\left[1-e^{i(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2i(c+d\,x)}}\right]-i\sqrt{2}\,B\,\mathrm{Log}\left[1-e^{i(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2i(c+d\,x)}}\right]\right)\right)\Big/\left(d\sqrt{a\,(1+\mathrm{Cos}[c+d\,x])}\right)$$

Problem 526: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B\,\mathrm{Cos}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 3, 181 leaves, 7 steps):

$$\frac{(2\,A-B)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{\sqrt{a}\,d}-\frac{1}{\sqrt{a}\,d}\sqrt{2}\,(A-B)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{B\,\mathrm{Sin}[c+d\,x]}{d\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 3, 542 leaves):

$$\frac{1}{4 d \sqrt{a (1 + \text{Cos}[c + d x])}} e^{-2 i (c+d x)} \left(1 + e^{i (c+d x)}\right) \left(i B - i B e^{i (c+d x)} + i B e^{2 i (c+d x)} - i B e^{3 i (c+d x)} + 2 A d e^{i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} x - B d e^{i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} x - i (2 A - B) e^{i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{ArcSinh}\left[e^{i (c+d x)}\right] + 2 i \sqrt{2} (A - B) e^{i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 + e^{i (c+d x)}\right] + 2 i A e^{i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 + \sqrt{1 + e^{2 i (c+d x)}}\right] - i B e^{i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 + \sqrt{1 + e^{2 i (c+d x)}}\right] - 2 i \sqrt{2} A e^{i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right] + 2 i \sqrt{2} B e^{i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right]\right) \sqrt{\text{Sec}[c + d x]}$$

Problem 527: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + B \text{Cos}[c + d x]}{\sqrt{a + a \text{Cos}[c + d x]} \text{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 3, 230 leaves, 8 steps):

$$-\frac{(4 A - 7 B) \text{ArcSin}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right] \sqrt{\text{Cos}[c + d x]} \sqrt{\text{Sec}[c + d x]}}{4 \sqrt{a} d} + \frac{1}{\sqrt{a} d} \sqrt{2} (A - B) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c + d x]}{\sqrt{2} \sqrt{\text{Cos}[c + d x]} \sqrt{a + a \text{Cos}[c + d x]}}\right] \sqrt{\text{Cos}[c + d x]} \sqrt{\text{Sec}[c + d x]} + \frac{B \text{Sin}[c + d x]}{2 d \sqrt{a + a \text{Cos}[c + d x]} \text{Sec}[c + d x]^{3/2}} + \frac{(4 A - B) \text{Sin}[c + d x]}{4 d \sqrt{a + a \text{Cos}[c + d x]} \sqrt{\text{Sec}[c + d x]}}$$

Result (type 3, 638 leaves):

$$\frac{1}{16 d \sqrt{a (1 + \text{Cos}[c + d x])}} e^{-3 i (c+d x)} \left(1 + e^{i (c+d x)}\right) \left(i B + 4 i A e^{i (c+d x)} - 2 i B e^{i (c+d x)} - 4 i A e^{2 i (c+d x)} + 3 i B e^{2 i (c+d x)} + 4 i A e^{3 i (c+d x)} - 3 i B e^{3 i (c+d x)} - 4 i A e^{4 i (c+d x)} + 2 i B e^{4 i (c+d x)} - i B e^{5 i (c+d x)} - 4 A d e^{2 i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} x + 7 B d e^{2 i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} x + i (4 A - 7 B) e^{2 i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{ArcSinh}\left[e^{i (c+d x)}\right] - 8 i \sqrt{2} (A - B) e^{2 i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 + e^{i (c+d x)}\right] - 4 i A e^{2 i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 + \sqrt{1 + e^{2 i (c+d x)}}\right] + 7 i B e^{2 i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 + \sqrt{1 + e^{2 i (c+d x)}}\right] + 8 i \sqrt{2} A e^{2 i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right] - 8 i \sqrt{2} B e^{2 i (c+d x)} \sqrt{1 + e^{2 i (c+d x)}} \text{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right]\right) \sqrt{\text{Sec}[c + d x]}$$

Problem 528: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

$$\int \frac{\left(a\,A + (A\,b + a\,B)\,\text{Cos}[c + d\,x] + b\,B\,\text{Cos}[c + d\,x]^2\right)\sqrt{\text{Sec}[c + d\,x]}}{\sqrt{a + a\,\text{Cos}[c + d\,x]}}\,dx$$

Optimal (type 3, 192 leaves, 7 steps):

$$\frac{1}{\sqrt{a}\,d}(2\,A\,b + 2\,a\,B - b\,B)\,\text{ArcSin}\left[\frac{\sqrt{a}\,\text{Sin}[c + d\,x]}{\sqrt{a + a\,\text{Cos}[c + d\,x]}}\right]\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{\text{Sec}[c + d\,x]} + \frac{1}{\sqrt{a}\,d}\sqrt{2}\,(a - b)\,(A - B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c + d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{a + a\,\text{Cos}[c + d\,x]}}\right]\sqrt{\text{Cos}[c + d\,x]}\,\sqrt{\text{Sec}[c + d\,x]} + \frac{b\,B\,\text{Sin}[c + d\,x]}{d\,\sqrt{a + a\,\text{Cos}[c + d\,x]}\,\sqrt{\text{Sec}[c + d\,x]}}$$

Result (type 3, 807 leaves):

$$\frac{1}{4\,d\,\sqrt{a\,(1 + \text{Cos}[c + d\,x])}}\,e^{-2\,i\,(c+d\,x)}\left(1 + e^{i\,(c+d\,x)}\right)\Big(i\,b\,B - i\,b\,B\,e^{i\,(c+d\,x)} + i\,b\,B\,e^{2\,i\,(c+d\,x)} - i\,b\,B\,e^{3\,i\,(c+d\,x)} + 2\,A\,b\,d\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,x + 2\,a\,B\,d\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,x - b\,B\,d\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,x - i\,(2\,A\,b + 2\,a\,B - b\,B)\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{ArcSinh}\left[e^{i\,(c+d\,x)}\right] - 2\,i\,\sqrt{2}\,(a - b)\,(A - B)\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1 + e^{i\,(c+d\,x)}\right] + 2\,i\,A\,b\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1 + \sqrt{1 + e^{2\,i\,(c+d\,x)}}\right] + 2\,i\,a\,B\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1 + \sqrt{1 + e^{2\,i\,(c+d\,x)}}\right] - i\,b\,B\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1 + \sqrt{1 + e^{2\,i\,(c+d\,x)}}\right] + 2\,i\,\sqrt{2}\,a\,A\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1 - e^{i\,(c+d\,x)} + \sqrt{2}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\right] - 2\,i\,\sqrt{2}\,A\,b\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1 - e^{i\,(c+d\,x)} + \sqrt{2}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\right] - 2\,i\,\sqrt{2}\,a\,B\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1 - e^{i\,(c+d\,x)} + \sqrt{2}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\right] + 2\,i\,\sqrt{2}\,b\,B\,e^{i\,(c+d\,x)}\sqrt{1 + e^{2\,i\,(c+d\,x)}}\,\text{Log}\left[1 - e^{i\,(c+d\,x)} + \sqrt{2}\,\sqrt{1 + e^{2\,i\,(c+d\,x)}}\right]\Big)\sqrt{\text{Sec}[c + d\,x]}$$

Problem 529: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A + B\,\text{Cos}[c + d\,x])\,\text{Sec}[c + d\,x]^{9/2}}{(a + a\,\text{Cos}[c + d\,x])^{3/2}}\,dx$$

Optimal (type 3, 317 leaves, 9 steps):

$$\frac{1}{2\sqrt{2}\,a^{3/2}\,d}(19\,A-15\,B)\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\Big]$$
$$\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(1201\,A-1029\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{210\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}+$$
$$\frac{(397\,A-273\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{210\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(67\,A-63\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{70\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-$$
$$\frac{(A-B)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(11\,A-7\,B)\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{14\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 279 leaves):

$$\Bigg(\text{Cos}\Big[\frac{1}{2}(c+d\,x)\Big]^3\Bigg(-\frac{1}{d}\mathbb{i}\,(19\,A-15\,B)\,e^{-\frac{1}{2}\mathbb{i}\,(c+d\,x)}\sqrt{\frac{e^{\mathbb{i}\,(c+d\,x)}}{1+e^{2\,\mathbb{i}\,(c+d\,x)}}}\,\sqrt{1+e^{2\,\mathbb{i}\,(c+d\,x)}}$$
$$\Big(\text{Log}\big[1+e^{\mathbb{i}\,(c+d\,x)}\big]-\text{Log}\big[1-e^{\mathbb{i}\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,\mathbb{i}\,(c+d\,x)}}\big]\Big)-\frac{1}{840\,d}$$
$$(2339\,A-2751\,B+24\,(213\,A-217\,B)\,\text{Cos}[c+d\,x]+60\,(67\,A-63\,B)\,\text{Cos}[2\,(c+d\,x)]+1608\,A\,\text{Cos}[$$
$$3\,(c+d\,x)]-1512\,B\,\text{Cos}[3\,(c+d\,x)]+1201\,A\,\text{Cos}[4\,(c+d\,x)]-1029\,B\,\text{Cos}[4\,(c+d\,x)])$$
$$\text{Sec}\Big[\frac{1}{2}(c+d\,x)\Big]\,\text{Sec}[c+d\,x]^{7/2}\,\text{Tan}\Big[\frac{1}{2}(c+d\,x)\Big]\Bigg)\Bigg)\Bigg/\,\big(a\,(1+\text{Cos}[c+d\,x])\big)^{3/2}$$

Problem 530: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{7/2}}{(a+a\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 270 leaves, 8 steps):

$$-\frac{1}{2\sqrt{2}\,a^{3/2}\,d}$$
$$(15\,A-11\,B)\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\Big]\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}+$$
$$\frac{(147\,A-95\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{30\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(39\,A-35\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{30\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-$$
$$\frac{(A-B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(9\,A-5\,B)\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{10\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 253 leaves):

$$\frac{1}{60\,d\,\left(a\,\left(1+\cos[c+d\,x]\right)\right)^{3/2}}\cos\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(60\,i\,(15\,A-11\,B)\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\left(264\,A-120\,B+(393\,A-205\,B)\,\cos[c+d\,x]+24\,(9\,A-5\,B)\,\cos[2\,(c+d\,x)]+147\,A\,\cos[3\,(c+d\,x)]-95\,B\,\cos[3\,(c+d\,x)]\right)\,\sec\left[\frac{1}{2}\,(c+d\,x)\right]\,\sec[c+d\,x]^{5/2}\,\tan\left[\frac{1}{2}\,(c+d\,x)\right]\right)$$

Problem 531: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(A+B\cos[c+d\,x])\,\sec[c+d\,x]^{5/2}}{(a+a\cos[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 223 leaves, 7 steps):

$$\frac{1}{2\,\sqrt{2}\,a^{3/2}\,d}(11\,A-7\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\sin[c+d\,x]}{\sqrt{2}\,\sqrt{\cos[c+d\,x]}\,\sqrt{a+a\cos[c+d\,x]}}\right]\sqrt{\cos[c+d\,x]}\,\sqrt{\sec[c+d\,x]}-\frac{(19\,A-15\,B)\,\sqrt{\sec[c+d\,x]}\,\sin[c+d\,x]}{6\,a\,d\,\sqrt{a+a\cos[c+d\,x]}}-\frac{(A-B)\,\sec[c+d\,x]^{3/2}\,\sin[c+d\,x]}{2\,d\,(a+a\cos[c+d\,x])^{3/2}}+\frac{(7\,A-3\,B)\,\sec[c+d\,x]^{3/2}\,\sin[c+d\,x]}{6\,a\,d\,\sqrt{a+a\cos[c+d\,x]}}$$

Result (type 3, 232 leaves):

$$\left(\cos\left[\frac{1}{2}\,(c+d\,x)\right]^3\left(-\frac{1}{d}i\,(11\,A-7\,B)\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)-\frac{1}{6\,d}(11\,A-15\,B+24\,(A-B)\,\cos[c+d\,x]+(19\,A-15\,B)\,\cos[2\,(c+d\,x)])\,\sec\left[\frac{1}{2}\,(c+d\,x)\right]\,\sec[c+d\,x]^{3/2}\,\tan\left[\frac{1}{2}\,(c+d\,x)\right]\right)\right)\Big/\left(a\,(1+\cos[c+d\,x])\right)^{3/2}$$

Problem 532: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(A+B\cos[c+d\,x])\,\sec[c+d\,x]^{3/2}}{(a+a\cos[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 176 leaves, 6 steps):

$$-\frac{1}{2\sqrt{2}\,a^{3/2}\,d}(7\,A-3\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(A-B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(5\,A-B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,a\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 208 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\left(i\,(7\,A-3\,B)\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+(4\,A+(5\,A-B)\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\text{Sec}[c+d\,x]}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/\left(d\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\right)$$

Problem 533: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(A+B\,\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}[c+d\,x]}}{(a+a\,\text{Cos}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 127 leaves, 5 steps):

$$\frac{1}{2\sqrt{2}\,a^{3/2}\,d}(3\,A+B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(A-B)\,\text{Sin}[c+d\,x]}{2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 213 leaves):

$$-\left(\left(i\,\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^3\left((3\,A+B)\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{1}{2}\,i\,(A-B)\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\sqrt{\text{Sec}[c+d\,x]}\left(\text{Sin}\left[\frac{1}{2}(c+d\,x)\right]-\text{Sin}\left[\frac{3}{2}(c+d\,x)\right]\right)\right)\right)\Big/\left(d\,(a\,(1+\text{Cos}[c+d\,x]))^{3/2}\right)\right)$$

Problem 534: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{A + B \operatorname{Cos}[c + d x]}{(a + a \operatorname{Cos}[c + d x])^{3/2} \sqrt{\operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 3, 185 leaves, 7 steps):

$$\frac{2 B \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}{a^{3/2} d} + \frac{1}{2 \sqrt{2} a^{3/2} d} (A - 5 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c + d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} + \frac{(A - B) \operatorname{Sin}[c + d x]}{2 d (a + a \operatorname{Cos}[c + d x])^{3/2} \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 3, 326 leaves):

$$\frac{1}{2 d (a (1 + \operatorname{Cos}[c + d x]))^{3/2}} \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^3 \left(\sqrt{2} e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}} \sqrt{1 + e^{2 i (c+d x)}} \left(4 B d x - 4 i B \operatorname{ArcSinh}\left[e^{i (c+d x)}\right] - i \sqrt{2} (A - 5 B) \operatorname{Log}\left[1 + e^{i (c+d x)}\right] + 4 i B \operatorname{Log}\left[1 + \sqrt{1 + e^{2 i (c+d x)}}\right] + i \sqrt{2} A \operatorname{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right] - 5 i \sqrt{2} B \operatorname{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right]\right) + (A - B) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^2 \sqrt{\operatorname{Sec}[c + d x]} \left(-\operatorname{Sin}\left[\frac{1}{2} (c + d x)\right] + \operatorname{Sin}\left[\frac{3}{2} (c + d x)\right]\right)\right)$$

Problem 535: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + B \operatorname{Cos}[c + d x]}{(a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 3, 237 leaves, 8 steps):

$$\frac{(2 A - 3 B) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}{a^{3/2} d} - \frac{1}{2 \sqrt{2} a^{3/2} d} (5 A - 9 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c + d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} + \frac{(A - B) \operatorname{Sin}[c + d x]}{2 d (a + a \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x]^{3/2}} - \frac{(A - 3 B) \operatorname{Sin}[c + d x]}{2 a d \sqrt{a + a \operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]}}$$

Result (type 3, 944 leaves):

$$\left(i A e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(\operatorname{Log}\left[1+e^{i (c+d x)}\right]-\operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right) -$$

$$\left(3 i B e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(\operatorname{Log}\left[1+e^{i (c+d x)}\right]-\operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right) +$$

$$\left(2 \sqrt{2} A e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(d x - i \operatorname{ArcSinh}\left[e^{i (c+d x)}\right] + i \sqrt{2} \operatorname{Log}\left[1+e^{i (c+d x)}\right] + i \operatorname{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right] - i \sqrt{2} \operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right) -$$

$$\left(3 \sqrt{2} B e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \left(d x - i \operatorname{ArcSinh}\left[e^{i (c+d x)}\right] + i \sqrt{2} \operatorname{Log}\left[1+e^{i (c+d x)}\right] + i \operatorname{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right] - i \sqrt{2} \operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(d \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}\right) +$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \sqrt{\operatorname{Sec}[c+d x]} \left(-\frac{2 A \operatorname{Cos}\left[\frac{d x}{2}\right] \operatorname{Sin}\left[\frac{c}{2}\right]}{d} + \frac{\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \left(A \operatorname{Sin}\left[\frac{c}{2}\right] - B \operatorname{Sin}\left[\frac{c}{2}\right]\right)}{d} + \frac{2 B \operatorname{Cos}\left[\frac{3 d x}{2}\right] \operatorname{Sin}\left[\frac{3 c}{2}\right]}{d} - \frac{2 A \operatorname{Cos}\left[\frac{c}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]}{d} + \frac{\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(A \operatorname{Sin}\left[\frac{d x}{2}\right] - B \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{d} + \frac{2 B \operatorname{Cos}\left[\frac{3 c}{2}\right] \operatorname{Sin}\left[\frac{3 d x}{2}\right]}{d}\right)\right) \Big/ \left(a \left(1+\operatorname{Cos}[c+d x]\right)\right)^{3/2}$$

Problem 536: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{7/2}}{(a + a \operatorname{Cos}[c + d x])^{5/2}} \, dx$$

Optimal (type 3, 317 leaves, 9 steps):

$$-\frac{1}{16 \sqrt{2}\, a^{5/2} d}(283 A - 163 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c + d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c + d x]} \sqrt{a + a \operatorname{Cos}[c + d x]}}\right] \sqrt{\operatorname{Cos}[c + d x]} \sqrt{\operatorname{Sec}[c + d x]} + \frac{(2671 A - 1495 B) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{240 a^2 d \sqrt{a + a \operatorname{Cos}[c + d x]}} - \frac{(787 A - 475 B) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{240 a^2 d \sqrt{a + a \operatorname{Cos}[c + d x]}} - \frac{(A - B) \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{4 d (a + a \operatorname{Cos}[c + d x])^{5/2}} - \frac{(21 A - 13 B) \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{16 a d (a + a \operatorname{Cos}[c + d x])^{3/2}} + \frac{(157 A - 85 B) \operatorname{Sec}[c + d x]^{5/2} \operatorname{Sin}[c + d x]}{80 a^2 d \sqrt{a + a \operatorname{Cos}[c + d x]}}$$

Result (type 3, 278 leaves):

$$\frac{1}{960 d (a (1 + \operatorname{Cos}[c + d x]))^{5/2}} \operatorname{Cos}\left[\frac{1}{2} (c + d x)\right]^5 \left(240 i (283 A - 163 B) e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1 + e^{2 i (c+d x)}}} \sqrt{1 + e^{2 i (c+d x)}} \left(\operatorname{Log}\left[1 + e^{i (c+d x)}\right] - \operatorname{Log}\left[1 - e^{i (c+d x)} + \sqrt{2} \sqrt{1 + e^{2 i (c+d x)}}\right]\right) + (15053 A - 7685 B + 10 (2605 A - 1381 B) \operatorname{Cos}[c + d x] + 108 (157 A - 85 B) \operatorname{Cos}[2 (c + d x)] + 9110 A \operatorname{Cos}[3 (c + d x)] - 5030 B \operatorname{Cos}[3 (c + d x)] + 2671 A \operatorname{Cos}[4 (c + d x)] - 1495 B \operatorname{Cos}[4 (c + d x)]) \operatorname{Sec}\left[\frac{1}{2} (c + d x)\right]^3 \operatorname{Sec}[c + d x]^{5/2} \operatorname{Tan}\left[\frac{1}{2} (c + d x)\right]\right)$$

Problem 537: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{5/2}}{(a + a \operatorname{Cos}[c + d x])^{5/2}} \, dx$$

Optimal (type 3, 270 leaves, 8 steps):

$$\frac{1}{16\sqrt{2}\,a^{5/2}\,d}(163\,A-75\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(299\,A-147\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{48\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(A-B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}-\frac{(17\,A-9\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(95\,A-39\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{48\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 261 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^5\left(-\frac{1}{d}\,\mathrm{i}\,(163\,A-75\,B)\,e^{-\frac{1}{2}\mathrm{i}\,(c+d\,x)}\sqrt{\frac{e^{\mathrm{i}\,(c+d\,x)}}{1+e^{2\,\mathrm{i}\,(c+d\,x)}}}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\left(\text{Log}\left[1+e^{\mathrm{i}\,(c+d\,x)}\right]-\text{Log}\left[1-e^{\mathrm{i}\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,\mathrm{i}\,(c+d\,x)}}\right]\right)-\frac{1}{24\,d}(878\,A-510\,B+(1537\,A-825\,B)\,\text{Cos}[c+d\,x]+2\,(503\,A-255\,B)\,\text{Cos}[2\,(c+d\,x)]+299\,A\,\text{Cos}[3\,(c+d\,x)]-147\,B\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^3\,\text{Sec}[c+d\,x]^{3/2}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\right)\Big/\left(4\,(a\,(1+\text{Cos}[c+d\,x]))^{5/2}\right)$$

Problem 538: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}}{(a+a\,\text{Cos}[c+d\,x])^{5/2}}\,dx$$

Optimal (type 3, 223 leaves, 7 steps):

$$-\frac{1}{16\sqrt{2}\,a^{5/2}\,d}(75\,A-19\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(A-B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}-\frac{(13\,A-5\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{16\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(49\,A-9\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 236 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left(i\,(75 A-19 B)\,e^{-\frac{1}{2} i (c+d x)}\sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\right.\right.$$

$$\sqrt{1+e^{2 i (c+d x)}}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\right)+$$

$$\frac{1}{4}\left(113 A-9 B+2\,(85 A-13 B)\,\text{Cos}[c+d x]+(49 A-9 B)\,\text{Cos}[2 (c+d x)]\right)$$

$$\left.\left.\text{Sec}\left[\frac{1}{2}(c+d x)\right]^3\sqrt{\text{Sec}[c+d x]}\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Big/\left(4 d\,(a\,(1+\text{Cos}[c+d x]))^{5/2}\right)$$

Problem 539: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(A+B\,\text{Cos}[c+d x])\sqrt{\text{Sec}[c+d x]}}{(a+a\,\text{Cos}[c+d x])^{5/2}}\,dx$$

Optimal (type 3, 176 leaves, 6 steps):

$$\frac{1}{16\sqrt{2}\,a^{5/2}\,d}$$

$$(19 A+5 B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d x]}{\sqrt{2}\sqrt{\text{Cos}[c+d x]}\sqrt{a+a\,\text{Cos}[c+d x]}}\right]\sqrt{\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}-$$

$$\frac{(A-B)\,\text{Sin}[c+d x]}{4 d\,(a+a\,\text{Cos}[c+d x])^{5/2}\sqrt{\text{Sec}[c+d x]}}-\frac{(9 A-B)\,\text{Sin}[c+d x]}{16 a d\,(a+a\,\text{Cos}[c+d x])^{3/2}\sqrt{\text{Sec}[c+d x]}}$$

Result (type 3, 233 leaves):

$$-\left(\left(\left(i\,\text{Cos}\left[\frac{1}{2}(c+d x)\right]^5\left((19 A+5 B)\,e^{-\frac{1}{2} i (c+d x)}\sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}}\right.\right.\right.\right.$$

$$\sqrt{1+e^{2 i (c+d x)}}\left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2}\sqrt{1+e^{2 i (c+d x)}}\right]\right)+$$

$$\frac{1}{4}\,i\,(13 A-5 B+(9 A-B)\,\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\sqrt{\text{Sec}[c+d x]}$$

$$\left.\left.\left.\left(\text{Sin}\left[\frac{1}{2}(c+d x)\right]-\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)\right)\right)\Big/\left(4 d\,(a\,(1+\text{Cos}[c+d x]))^{5/2}\right)\right)$$

Problem 540: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d x]}{(a+a\,\text{Cos}[c+d x])^{5/2}\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 3, 174 leaves, 6 steps):

$$\frac{1}{16\sqrt{2}\,a^{5/2}\,d}$$
$$\left(5\,A+3\,B\right)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}\,+$$
$$\frac{(A-B)\,\text{Sin}[c+d\,x]}{4\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{(A+7\,B)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 230 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5\,\left(-\,i\,\left(5\,A+3\,B\right)\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\right.\right.$$
$$\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$
$$\frac{1}{4}\,\left(5\,A+3\,B+(A+7\,B)\,\text{Cos}[c+d\,x]\right)\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4\,\sqrt{\text{Sec}[c+d\,x]}$$
$$\left.\left.\left(-\text{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\text{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]\right)\right)\right)\Big/\left(4\,d\,\left(a\,\left(1+\text{Cos}[c+d\,x]\right)\right)^{5/2}\right)$$

Problem 541: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\,\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 3, 234 leaves, 8 steps):

$$\frac{2\,B\,\text{ArcSin}\left[\frac{\sqrt{a}\,\,\text{Sin}[c+d\,x]}{\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}}{a^{5/2}\,d}+\frac{1}{16\,\sqrt{2}\,a^{5/2}\,d}$$
$$\left(3\,A-43\,B\right)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\,\sqrt{\text{Cos}[c+d\,x]}\,\,\sqrt{\text{Sec}[c+d\,x]}\,+$$
$$\frac{(A-B)\,\text{Sin}[c+d\,x]}{4\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{5/2}\,\text{Sec}[c+d\,x]^{3/2}}+\frac{\left(3\,A-11\,B\right)\,\text{Sin}[c+d\,x]}{16\,a\,d\,\left(a+a\,\text{Cos}[c+d\,x]\right)^{3/2}\,\sqrt{\text{Sec}[c+d\,x]}}$$

Result (type 3, 347 leaves):

$$\frac{1}{8\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{5/2}}\mathrm{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5$$

$$\left(\sqrt{2}\,e^{-\frac{1}{2}\,i\,(c+d\,x)}\,\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\left(32\,B\,d\,x-32\,i\,B\,\mathrm{ArcSinh}\left[e^{i\,(c+d\,x)}\right]-\right.\right.$$
$$i\,\sqrt{2}\,\left(3\,A-43\,B\right)\,\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]+32\,i\,B\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]+3\,i\,\sqrt{2}\,A\,\mathrm{Log}\left[\right.$$
$$\left.\left.1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-43\,i\,\sqrt{2}\,B\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+$$
$$\frac{1}{2}\,\left(3\,A-11\,B+\left(7\,A-15\,B\right)\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4\,\sqrt{\mathrm{Sec}[c+d\,x]}$$
$$\left.\left(-\mathrm{Sin}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+\mathrm{Sin}\left[\frac{3}{2}\,\left(c+d\,x\right)\right]\right)\right)$$

Problem 542: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\mathrm{Cos}[c+d\,x]}{\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\,\mathrm{Sec}[c+d\,x]^{5/2}}\,dx$$

Optimal (type 3, 286 leaves, 9 steps):

$$\frac{\left(2\,A-5\,B\right)\,\mathrm{ArcSin}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}{a^{5/2}\,d}-\frac{1}{16\,\sqrt{2}\,a^{5/2}\,d}$$
$$\left(43\,A-115\,B\right)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}}\right]\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}+$$
$$\frac{\left(A-B\right)\,\mathrm{Sin}[c+d\,x]}{4\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{5/2}\,\mathrm{Sec}[c+d\,x]^{5/2}}+$$
$$\frac{\left(7\,A-15\,B\right)\,\mathrm{Sin}[c+d\,x]}{16\,a\,d\,\left(a+a\,\mathrm{Cos}[c+d\,x]\right)^{3/2}\,\mathrm{Sec}[c+d\,x]^{3/2}}-\frac{\left(11\,A-35\,B\right)\,\mathrm{Sin}[c+d\,x]}{16\,a^2\,d\,\sqrt{a+a\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 3, 1037 leaves):

$$\left(11\,i\,A\,e^{-\frac{1}{2}i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\right.$$

$$\left.\left(\mathrm{Log}\left[1+e^{i(c+dx)}\right]-\mathrm{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\right)\Big/\left(4\,d\,\left(a\,\left(1+\mathrm{Cos}[c+dx]\right)\right)^{5/2}\right)-$$

$$\left(35\,i\,B\,e^{-\frac{1}{2}i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\right.$$

$$\left.\left(\mathrm{Log}\left[1+e^{i(c+dx)}\right]-\mathrm{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\right)\Big/\left(4\,d\,\left(a\,\left(1+\mathrm{Cos}[c+dx]\right)\right)^{5/2}\right)+$$

$$\left(4\sqrt{2}\,A\,e^{-\frac{1}{2}i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\right.$$

$$\left(d\,x-i\,\mathrm{ArcSinh}\left[e^{i(c+dx)}\right]+i\sqrt{2}\,\mathrm{Log}\left[1+e^{i(c+dx)}\right]+i\,\mathrm{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]-\right.$$

$$\left.\left.i\sqrt{2}\,\mathrm{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\right)\Big/\left(d\,\left(a\,\left(1+\mathrm{Cos}[c+dx]\right)\right)^{5/2}\right)-$$

$$\left(10\sqrt{2}\,B\,e^{-\frac{1}{2}i(c+dx)}\sqrt{\frac{e^{i(c+dx)}}{1+e^{2i(c+dx)}}}\sqrt{1+e^{2i(c+dx)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\right.$$

$$\left(d\,x-i\,\mathrm{ArcSinh}\left[e^{i(c+dx)}\right]+i\sqrt{2}\,\mathrm{Log}\left[1+e^{i(c+dx)}\right]+i\,\mathrm{Log}\left[1+\sqrt{1+e^{2i(c+dx)}}\right]-\right.$$

$$\left.\left.i\sqrt{2}\,\mathrm{Log}\left[1-e^{i(c+dx)}+\sqrt{2}\sqrt{1+e^{2i(c+dx)}}\right]\right)\right)\Big/\left(d\,\left(a\,\left(1+\mathrm{Cos}[c+dx]\right)\right)^{5/2}\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\sqrt{\mathrm{Sec}[c+dx]}\,\left(\frac{15\,(-A+B)\,\mathrm{Cos}\left[\frac{dx}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{2\,d}+\frac{4\,B\,\mathrm{Cos}\left[\frac{3dx}{2}\right]\mathrm{Sin}\left[\frac{3c}{2}\right]}{d}-\right.\right.$$

$$\frac{15\,(A-B)\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{dx}{2}\right]}{2\,d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(19\,A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-27\,B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{4\,d}+$$

$$\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(-A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{2\,d}+\frac{4\,B\,\mathrm{Cos}\left[\frac{3c}{2}\right]\mathrm{Sin}\left[\frac{3dx}{2}\right]}{d}+$$

$$\left.\left.\frac{(19\,A-27\,B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\mathrm{Tan}\left[\frac{c}{2}\right]}{4\,d}-\frac{(A-B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\mathrm{Tan}\left[\frac{c}{2}\right]}{2\,d}\right)\right)\Big/\left(a\,\left(1+\mathrm{Cos}[c+dx]\right)\right)^{5/2}$$

Problem 543: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{5/2}}{(a+a\,\text{Cos}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 3, 317 leaves, 9 steps):

$$\frac{1}{64\sqrt{2}\,a^{7/2}\,d}(1015\,A-363\,B)\,\text{ArcTan}\Big[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\Big]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(1887\,A-691\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{192\,a^3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}-\frac{(A-B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{6\,d\,(a+a\,\text{Cos}[c+d\,x])^{7/2}}-\frac{(23\,A-11\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{48\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}-\frac{(109\,A-41\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{64\,a^2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(579\,A-199\,B)\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{192\,a^3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 532 leaves):

$$-\Bigg(\bigg(\Big(i\,(1015\,A-363\,B)\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^7\Big(\text{Log}\big[1+e^{i\,(c+d\,x)}\big]-\text{Log}\Big[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\Big]\Big)\bigg)\Big/\Big(8\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{7/2}\Big)\Bigg)+\frac{1}{(a\,(1+\text{Cos}[c+d\,x]))^{7/2}}\text{Cos}\Big[\frac{c}{2}+\frac{d\,x}{2}\Big]^7\sqrt{\text{Sec}[c+d\,x]}\Bigg(-\frac{(1887\,A-691\,B)\,\text{Cos}\big[\frac{d\,x}{2}\big]\,\text{Sin}\big[\frac{c}{2}\big]}{12\,d}-\frac{(1887\,A-691\,B)\,\text{Cos}\big[\frac{c}{2}\big]\,\text{Sin}\big[\frac{d\,x}{2}\big]}{12\,d}+\frac{\text{Sec}\big[\frac{c}{2}\big]\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]^2\,\big(451\,A\,\text{Sin}\big[\frac{d\,x}{2}\big]-199\,B\,\text{Sin}\big[\frac{d\,x}{2}\big]\big)}{24\,d}+\frac{\text{Sec}\big[\frac{c}{2}\big]\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]^4\,\big(31\,A\,\text{Sin}\big[\frac{d\,x}{2}\big]-19\,B\,\text{Sin}\big[\frac{d\,x}{2}\big]\big)}{12\,d}+\frac{\text{Sec}\big[\frac{c}{2}\big]\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]^6\,\big(A\,\text{Sin}\big[\frac{d\,x}{2}\big]-B\,\text{Sin}\big[\frac{d\,x}{2}\big]\big)}{3\,d}+\frac{32\,A\,\text{Sec}[c+d\,x]\,\text{Sin}\big[\frac{c}{2}+\frac{d\,x}{2}\big]}{3\,d}+\frac{(451\,A-199\,B)\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]\,\text{Tan}\big[\frac{c}{2}\big]}{24\,d}+\frac{(31\,A-19\,B)\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]^3\,\text{Tan}\big[\frac{c}{2}\big]}{12\,d}+\frac{(A-B)\,\text{Sec}\big[\frac{c}{2}+\frac{d\,x}{2}\big]^5\,\text{Tan}\big[\frac{c}{2}\big]}{3\,d}\Bigg)$$

Problem 544: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}}{(a+a\,\text{Cos}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 3, 270 leaves, 8 steps):

$$-\frac{1}{64\sqrt{2}\,a^{7/2}\,d}3\,(121\,A-21\,B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+d\,x]}{\sqrt{2}\,\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}\right]\sqrt{\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}-\frac{(A-B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{6\,d\,(a+a\,\text{Cos}[c+d\,x])^{7/2}}-\frac{(19\,A-7\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{48\,a\,d\,(a+a\,\text{Cos}[c+d\,x])^{5/2}}-\frac{(199\,A-43\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{192\,a^2\,d\,(a+a\,\text{Cos}[c+d\,x])^{3/2}}+\frac{(691\,A-103\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{192\,a^3\,d\,\sqrt{a+a\,\text{Cos}[c+d\,x]}}$$

Result (type 3, 259 leaves):

$$\frac{1}{24\,d\,(a\,(1+\text{Cos}[c+d\,x]))^{7/2}}\text{Cos}\left[\frac{1}{2}(c+d\,x)\right]^7\left(9\,i\,(121\,A-21\,B)\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\left(\text{Log}\left[1+e^{i\,(c+d\,x)}\right]-\text{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)+\frac{1}{16}(5284\,A-532\,B+9\,(941\,A-121\,B)\,\text{Cos}[c+d\,x]+4\,(937\,A-133\,B)\,\text{Cos}[2\,(c+d\,x)]+691\,A\,\text{Cos}[3\,(c+d\,x)]-103\,B\,\text{Cos}[3\,(c+d\,x)])\,\text{Sec}\left[\frac{1}{2}(c+d\,x)\right]^5\sqrt{\text{Sec}[c+d\,x]}\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)$$

Problem 545: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(A+B\,\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}[c+d\,x]}}{(a+a\,\text{Cos}[c+d\,x])^{7/2}}\,dx$$

Optimal (type 3, 223 leaves, 7 steps):

$$\frac{1}{64\sqrt{2}\,a^{7/2}\,d}(63A+13B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}-\frac{(A-B)\,\text{Sin}[c+dx]}{6\,d\,(a+a\,\text{Cos}[c+dx])^{7/2}\,\sqrt{\text{Sec}[c+dx]}}-\frac{(5A-B)\,\text{Sin}[c+dx]}{16\,a\,d\,(a+a\,\text{Cos}[c+dx])^{5/2}\,\sqrt{\text{Sec}[c+dx]}}-\frac{(103A+5B)\,\text{Sin}[c+dx]}{192\,a^2\,d\,(a+a\,\text{Cos}[c+dx])^{3/2}\,\sqrt{\text{Sec}[c+dx]}}$$

Result (type 3, 505 leaves):

$$-\left(\left(\mathrm{i}\,(63A+13B)\,e^{-\frac{1}{2}\mathrm{i}\,(c+dx)}\sqrt{\frac{e^{\mathrm{i}\,(c+dx)}}{1+e^{2\mathrm{i}\,(c+dx)}}}\,\sqrt{1+e^{2\mathrm{i}\,(c+dx)}}\,\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^7\left(\text{Log}\left[1+e^{\mathrm{i}\,(c+dx)}\right]-\text{Log}\left[1-e^{\mathrm{i}\,(c+dx)}+\sqrt{2}\,\sqrt{1+e^{2\mathrm{i}\,(c+dx)}}\right]\right)\right)\Big/\left(8\,d\,(a\,(1+\text{Cos}[c+dx]))^{7/2}\right)\right)+$$

$$\left(\text{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^7\sqrt{\text{Sec}[c+dx]}\left(-\frac{(103A+5B)\,\text{Cos}\left[\frac{dx}{2}\right]\text{Sin}\left[\frac{c}{2}\right]}{12\,d}-\frac{(103A+5B)\,\text{Cos}\left[\frac{c}{2}\right]\text{Sin}\left[\frac{dx}{2}\right]}{12\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\left(A\,\text{Sin}\left[\frac{dx}{2}\right]-B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{3\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(7A\,\text{Sin}\left[\frac{dx}{2}\right]+5B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{12\,d}+\frac{\text{Sec}\left[\frac{c}{2}\right]\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(43A\,\text{Sin}\left[\frac{dx}{2}\right]+17B\,\text{Sin}\left[\frac{dx}{2}\right]\right)}{24\,d}+\frac{(43A+17B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\text{Tan}\left[\frac{c}{2}\right]}{24\,d}+\frac{(7A+5B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\text{Tan}\left[\frac{c}{2}\right]}{12\,d}+\frac{(A-B)\,\text{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\text{Tan}\left[\frac{c}{2}\right]}{3\,d}\right)\right)\Big/\left(a\,(1+\text{Cos}[c+dx])\right)^{7/2}$$

Problem 546: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+dx]}{(a+a\,\text{Cos}[c+dx])^{7/2}\,\sqrt{\text{Sec}[c+dx]}}\,dx$$

Optimal (type 3, 221 leaves, 7 steps):

$$\frac{1}{64\sqrt{2}\,a^{7/2}\,d}(13A+7B)\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Sin}[c+dx]}{\sqrt{2}\,\sqrt{\text{Cos}[c+dx]}\,\sqrt{a+a\,\text{Cos}[c+dx]}}\right]\sqrt{\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}+\frac{(A-B)\,\text{Sin}[c+dx]}{6\,d\,(a+a\,\text{Cos}[c+dx])^{7/2}\,\sqrt{\text{Sec}[c+dx]}}+\frac{(A+3B)\,\text{Sin}[c+dx]}{16\,a\,d\,(a+a\,\text{Cos}[c+dx])^{5/2}\,\sqrt{\text{Sec}[c+dx]}}-\frac{(5A-17B)\,\text{Sin}[c+dx]}{192\,a^2\,d\,(a+a\,\text{Cos}[c+dx])^{3/2}\,\sqrt{\text{Sec}[c+dx]}}$$

Result (type 3, 505 leaves):

$$-\left(\left(\left(\mathrm{i}\,(13A+7B)\,e^{-\frac{1}{2}\mathrm{i}\,(c+dx)}\sqrt{\frac{e^{\mathrm{i}\,(c+dx)}}{1+e^{2\mathrm{i}\,(c+dx)}}}\sqrt{1+e^{2\mathrm{i}\,(c+dx)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^7\left(\mathrm{Log}\left[1+e^{\mathrm{i}\,(c+dx)}\right]-\mathrm{Log}\left[1-e^{\mathrm{i}\,(c+dx)}+\sqrt{2}\sqrt{1+e^{2\mathrm{i}\,(c+dx)}}\right]\right)\right)\Big/\left(8d\left(a\left(1+\mathrm{Cos}[c+dx]\right)\right)^{7/2}\right)\right)+$$

$$\left(\mathrm{Cos}\left[\frac{c}{2}+\frac{dx}{2}\right]^7\sqrt{\mathrm{Sec}[c+dx]}\left(-\frac{(5A-17B)\,\mathrm{Cos}\left[\frac{dx}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{12d}-\frac{(5A-17B)\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{dx}{2}\right]}{12d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^4\left(5A\,\mathrm{Sin}\left[\frac{dx}{2}\right]-17B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{12d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^6\left(-A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{3d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^2\left(17A\,\mathrm{Sin}\left[\frac{dx}{2}\right]+19B\,\mathrm{Sin}\left[\frac{dx}{2}\right]\right)}{24d}+\frac{(17A+19B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]\mathrm{Tan}\left[\frac{c}{2}\right]}{24d}+\frac{(5A-17B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^3\mathrm{Tan}\left[\frac{c}{2}\right]}{12d}-\frac{(A-B)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{dx}{2}\right]^5\mathrm{Tan}\left[\frac{c}{2}\right]}{3d}\right)\right)\Big/\left(a\left(1+\mathrm{Cos}[c+dx]\right)\right)^{7/2}$$

Problem 547: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{A+B\,\mathrm{Cos}[c+dx]}{(a+a\,\mathrm{Cos}[c+dx])^{7/2}\,\mathrm{Sec}[c+dx]^{3/2}}\,dx$$

Optimal (type 3, 221 leaves, 7 steps):

$$\frac{1}{64\sqrt{2}\,a^{7/2}\,d}(7A+5B)\,\mathrm{ArcTan}\left[\frac{\sqrt{a}\,\mathrm{Sin}[c+dx]}{\sqrt{2}\sqrt{\mathrm{Cos}[c+dx]}\sqrt{a+a\,\mathrm{Cos}[c+dx]}}\right]\sqrt{\mathrm{Cos}[c+dx]}\sqrt{\mathrm{Sec}[c+dx]}+\frac{(A-B)\,\mathrm{Sin}[c+dx]}{6d\,(a+a\,\mathrm{Cos}[c+dx])^{7/2}\,\mathrm{Sec}[c+dx]^{3/2}}+\frac{(A-13B)\,\mathrm{Sin}[c+dx]}{48ad\,(a+a\,\mathrm{Cos}[c+dx])^{5/2}\sqrt{\mathrm{Sec}[c+dx]}}+\frac{(17A+67B)\,\mathrm{Sin}[c+dx]}{192a^2d\,(a+a\,\mathrm{Cos}[c+dx])^{3/2}\sqrt{\mathrm{Sec}[c+dx]}}$$

Result (type 3, 249 leaves):

$$\left(\text{Cos}\left[\frac{1}{2}(c+d x)\right]^7 \left(-3 i (7 A+5 B) e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \left(\text{Log}\left[1+e^{i (c+d x)}\right]-\text{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)+\frac{1}{16} (59 A+97 B+20 (7 A+5 B) \text{Cos}[c+d x]+(17 A+67 B) \text{Cos}[2 (c+d x)]) \text{Sec}\left[\frac{1}{2}(c+d x)\right]^6 \sqrt{\text{Sec}[c+d x]} \left(-\text{Sin}\left[\frac{1}{2}(c+d x)\right]+\text{Sin}\left[\frac{3}{2}(c+d x)\right]\right)\right)\right)\Big/\left(24 d (a (1+\text{Cos}[c+d x]))^{7/2}\right)$$

Problem 548: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B \text{Cos}[c+d x]}{(a+a \text{Cos}[c+d x])^{7/2} \text{Sec}[c+d x]^{5/2}} \, dx$$

Optimal (type 3, 281 leaves, 9 steps):

$$\frac{2 B \text{ArcSin}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{a+a \text{Cos}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}}{a^{7/2} d}+\frac{1}{64 \sqrt{2} a^{7/2} d}(5 A-177 B) \text{ArcTan}\left[\frac{\sqrt{a} \text{Sin}[c+d x]}{\sqrt{2} \sqrt{\text{Cos}[c+d x]} \sqrt{a+a \text{Cos}[c+d x]}}\right] \sqrt{\text{Cos}[c+d x]} \sqrt{\text{Sec}[c+d x]}+\frac{(A-B) \text{Sin}[c+d x]}{6 d (a+a \text{Cos}[c+d x])^{7/2} \text{Sec}[c+d x]^{5/2}}+\frac{(5 A-17 B) \text{Sin}[c+d x]}{48 a d (a+a \text{Cos}[c+d x])^{5/2} \text{Sec}[c+d x]^{3/2}}+\frac{(5 A-49 B) \text{Sin}[c+d x]}{64 a^2 d (a+a \text{Cos}[c+d x])^{3/2} \sqrt{\text{Sec}[c+d x]}}$$

Result (type 3, 621 leaves):

$$\left(e^{-\frac{1}{2} i (c+d x)} \sqrt{\frac{e^{i (c+d x)}}{1+e^{2 i (c+d x)}}} \sqrt{1+e^{2 i (c+d x)}} \operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 \left(128 B d x-128 i B \operatorname{ArcSinh}\left[e^{i (c+d x)}\right]-i \sqrt{2} (5 A-177 B) \operatorname{Log}\left[1+e^{i (c+d x)}\right]+128 i B \operatorname{Log}\left[1+\sqrt{1+e^{2 i (c+d x)}}\right]+5 i \sqrt{2} A \operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]-177 i \sqrt{2} B \operatorname{Log}\left[1-e^{i (c+d x)}+\sqrt{2} \sqrt{1+e^{2 i (c+d x)}}\right]\right)\right) \Big/ \left(8 \sqrt{2} d (a (1+\operatorname{Cos}[c+d x]))^{7/2}\right)+$$

$$\left(\operatorname{Cos}\left[\frac{c}{2}+\frac{d x}{2}\right]^7 \sqrt{\operatorname{Sec}[c+d x]} \left(\frac{(67 A-247 B) \operatorname{Cos}\left[\frac{d x}{2}\right] \operatorname{Sin}\left[\frac{c}{2}\right]}{12 d}+\frac{(67 A-247 B) \operatorname{Cos}\left[\frac{c}{2}\right] \operatorname{Sin}\left[\frac{d x}{2}\right]}{12 d}+\frac{\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^4 \left(29 A \operatorname{Sin}\left[\frac{d x}{2}\right]-41 B \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{12 d}+\frac{\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^6 \left(-A \operatorname{Sin}\left[\frac{d x}{2}\right]+B \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{3 d}+\frac{\operatorname{Sec}\left[\frac{c}{2}\right] \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^2 \left(-151 A \operatorname{Sin}\left[\frac{d x}{2}\right]+379 B \operatorname{Sin}\left[\frac{d x}{2}\right]\right)}{24 d}-\frac{(151 A-379 B) \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right] \operatorname{Tan}\left[\frac{c}{2}\right]}{24 d}+\frac{(29 A-41 B) \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^3 \operatorname{Tan}\left[\frac{c}{2}\right]}{12 d}-\frac{(A-B) \operatorname{Sec}\left[\frac{c}{2}+\frac{d x}{2}\right]^5 \operatorname{Tan}\left[\frac{c}{2}\right]}{3 d}\right)\right) \Big/ (a (1+\operatorname{Cos}[c+d x]))^{7/2}$$

Problem 549: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A+B \operatorname{Cos}[c+d x]}{(a+a \operatorname{Cos}[c+d x])^{7/2} \operatorname{Sec}[c+d x]^{7/2}} \, dx$$

Optimal (type 3, 333 leaves, 10 steps):

$$\frac{(2 A-7 B) \operatorname{ArcSin}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}{a^{7/2} d}-\frac{1}{64 \sqrt{2} a^{7/2} d}(177 A-637 B) \operatorname{ArcTan}\left[\frac{\sqrt{a} \operatorname{Sin}[c+d x]}{\sqrt{2} \sqrt{\operatorname{Cos}[c+d x]} \sqrt{a+a \operatorname{Cos}[c+d x]}}\right] \sqrt{\operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}+\frac{(A-B) \operatorname{Sin}[c+d x]}{6 d (a+a \operatorname{Cos}[c+d x])^{7/2} \operatorname{Sec}[c+d x]^{7/2}}+\frac{(3 A-7 B) \operatorname{Sin}[c+d x]}{16 a d (a+a \operatorname{Cos}[c+d x])^{5/2} \operatorname{Sec}[c+d x]^{5/2}}+\frac{(79 A-259 B) \operatorname{Sin}[c+d x]}{192 a^2 d (a+a \operatorname{Cos}[c+d x])^{3/2} \operatorname{Sec}[c+d x]^{3/2}}-\frac{7 (7 A-27 B) \operatorname{Sin}[c+d x]}{64 a^3 d \sqrt{a+a \operatorname{Cos}[c+d x]} \sqrt{\operatorname{Sec}[c+d x]}}$$

Result (type 3, 1125 leaves):

$$\left(49\,i\,A\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\left(\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]-\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(8\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{7/2}\right)-$$

$$\left(189\,i\,B\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\left(\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]-\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(8\,d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{7/2}\right)+$$

$$\left(8\sqrt{2}\,A\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\left(d\,x-i\,\mathrm{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+i\sqrt{2}\,\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]+i\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-i\sqrt{2}\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/\left(d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{7/2}\right)-$$

$$\left(28\sqrt{2}\,B\,e^{-\frac{1}{2}i\,(c+d\,x)}\sqrt{\frac{e^{i\,(c+d\,x)}}{1+e^{2\,i\,(c+d\,x)}}}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\,\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\left(d\,x-i\,\mathrm{ArcSinh}\left[e^{i\,(c+d\,x)}\right]+i\sqrt{2}\,\mathrm{Log}\left[1+e^{i\,(c+d\,x)}\right]+i\,\mathrm{Log}\left[1+\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]-i\sqrt{2}\,\mathrm{Log}\left[1-e^{i\,(c+d\,x)}+\sqrt{2}\,\sqrt{1+e^{2\,i\,(c+d\,x)}}\right]\right)\right)\Big/$$

$$\left(d\,\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{7/2}\right)+\frac{1}{\left(a\,\left(1+\mathrm{Cos}[c+d\,x]\right)\right)^{7/2}}\mathrm{Cos}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^7\sqrt{\mathrm{Sec}[c+d\,x]}$$

$$\left(\frac{(-247\,A+427\,B)\,\mathrm{Cos}\left[\frac{d\,x}{2}\right]\mathrm{Sin}\left[\frac{c}{2}\right]}{12\,d}+\frac{8\,B\,\mathrm{Cos}\left[\frac{3\,d\,x}{2}\right]\mathrm{Sin}\left[\frac{3\,c}{2}\right]}{d}-\right.$$

$$\frac{(247\,A-427\,B)\,\mathrm{Cos}\left[\frac{c}{2}\right]\mathrm{Sin}\left[\frac{d\,x}{2}\right]}{12\,d}+\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^2\left(379\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-703\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{24\,d}+$$

$$\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^6\left(A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]-B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{3\,d}+$$

$$\frac{\mathrm{Sec}\left[\frac{c}{2}\right]\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^4\left(-41\,A\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]+53\,B\,\mathrm{Sin}\left[\frac{d\,x}{2}\right]\right)}{12\,d}+$$

$$\frac{8\,B\,\mathrm{Cos}\left[\frac{3\,c}{2}\right]\,\mathrm{Sin}\left[\frac{3\,d\,x}{2}\right]}{d}+\frac{\left(379\,A-703\,B\right)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]\,\mathrm{Tan}\left[\frac{c}{2}\right]}{24\,d}-\frac{\left(41\,A-53\,B\right)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^3\,\mathrm{Tan}\left[\frac{c}{2}\right]}{12\,d}+\frac{\left(A-B\right)\,\mathrm{Sec}\left[\frac{c}{2}+\frac{d\,x}{2}\right]^5\,\mathrm{Tan}\left[\frac{c}{2}\right]}{3\,d}\Bigg)$$

Problem 571: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\mathrm{Cos}[c+d\,x]}{\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\mathrm{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 197 leaves, 10 steps):

$$\frac{2\,\left(A\,b-a\,B\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticE}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}}{b^2\,d}-\frac{1}{3\,b^3\,d}2\,\left(3\,a\,A\,b-3\,a^2\,B-b^2\,B\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticF}\left[\frac{1}{2}\,\left(c+d\,x\right),2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{1}{b^3\,\left(a+b\right)\,d}2\,a^2\,\left(A\,b-a\,B\right)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{EllipticPi}\left[\frac{2\,b}{a+b},\frac{1}{2}\,\left(c+d\,x\right),2\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}+\frac{2\,B\,\mathrm{Sin}[c+d\,x]}{3\,b\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}$$

Result (type 4, 548 leaves):

$$-\frac{1}{6\,b\,d}\Bigg(\Bigg(4\,B\,\mathrm{Cos}[c+d\,x]^2\,\mathrm{EllipticPi}\left[-\frac{a}{b},-\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\,\left(b+a\,\mathrm{Sec}[c+d\,x]\right)\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\Bigg)\Big/\left(\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)+\Bigg(2\,\left(-3\,A\,b+a\,B\right)\,\mathrm{Cos}[c+d\,x]^2\,\Bigg(\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]+\mathrm{EllipticPi}\left[-\frac{a}{b},-\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\Bigg)\,\left(b+a\,\mathrm{Sec}[c+d\,x]\right)\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\,\mathrm{Sin}[c+d\,x]\Bigg)\Big/\left(a\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\right)+\Bigg(\left(-3\,A\,b+3\,a\,B\right)\,\mathrm{Cos}\left[2\,\left(c+d\,x\right)\right]\,\left(b+a\,\mathrm{Sec}[c+d\,x]\right)\,\Bigg(-4\,a\,b+4\,a\,b\,\mathrm{Sec}[c+d\,x]^2-4\,a\,b\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+2\,\left(2\,a-b\right)\,b\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}+4\,a^2\,\mathrm{EllipticPi}\left[-\frac{a}{b},-\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}-2\,b^2\,\mathrm{EllipticPi}\left[-\frac{a}{b},-\mathrm{ArcSin}\left[\sqrt{\mathrm{Sec}[c+d\,x]}\right],-1\right]\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\sqrt{1-\mathrm{Sec}[c+d\,x]^2}\Bigg)\,\mathrm{Sin}[c+d\,x]\Bigg)\Big/\left(a\,b^2\,\left(a+b\,\mathrm{Cos}[c+d\,x]\right)\,\left(1-\mathrm{Cos}[c+d\,x]^2\right)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\left(2-\mathrm{Sec}[c+d\,x]^2\right)\right)\Bigg)+\frac{B\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}\left[2\,\left(c+d\,x\right)\right]}{3\,b\,d}$$

Problem 573: Result more than twice size of optimal antiderivative.

$$\int \frac{(A + B \operatorname{Cos}[c + d x]) \operatorname{Sec}[c + d x]^{3/2}}{(a + b \operatorname{Cos}[c + d x])^2} \, dx$$

Optimal (type 4, 316 leaves, 11 steps):

$$-\frac{1}{a^2 (a^2 - b^2) d} \left(2 a^2 A - 3 A b^2 + a b B\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticE}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]} + \frac{(A b - a B) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticF}\left[\frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}}{a (a^2 - b^2) d} - \left(\left(5 a^2 A b - 3 A b^3 - 3 a^3 B + a b^2 B\right) \sqrt{\operatorname{Cos}[c + d x]} \operatorname{EllipticPi}\left[\frac{2 b}{a + b}, \frac{1}{2} (c + d x), 2\right] \sqrt{\operatorname{Sec}[c + d x]}\right) \Big/ \left(a^2 (a - b) (a + b)^2 d\right) + \frac{\left(2 a^2 A - 3 A b^2 + a b B\right) \sqrt{\operatorname{Sec}[c + d x]} \operatorname{Sin}[c + d x]}{a^2 (a^2 - b^2) d} + \frac{b (A b - a B) \operatorname{Sec}[c + d x]^{3/2} \operatorname{Sin}[c + d x]}{a (a^2 - b^2) d (b + a \operatorname{Sec}[c + d x])}$$

Result (type 4, 687 leaves):

$$-\frac{1}{4a^2(a-b)(a+b)d}\Bigg(-\bigg(\Big(2\left(4a^3A-8aAb^2+4a^2bB\right)\mathrm{Cos}[c+dx]^2\,\mathrm{EllipticPi}\Big[-\frac{a}{b},-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+dx]}\Big],-1\Big]$$
$$\left(b+a\,\mathrm{Sec}[c+dx]\right)\sqrt{1-\mathrm{Sec}[c+dx]^2}\,\mathrm{Sin}[c+dx]\Big)\Big/$$
$$\left(b\left(a+b\,\mathrm{Cos}[c+dx]\right)\left(1-\mathrm{Cos}[c+dx]^2\right)\right)\bigg)+$$
$$\Big(2\left(10a^2Ab-9Ab^3-4a^3B+3ab^2B\right)\mathrm{Cos}[c+dx]^2\Big(\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+dx]}\Big],-1\Big]+$$
$$\mathrm{EllipticPi}\Big[-\frac{a}{b},-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+dx]}\Big],-1\Big]\Big)\left(b+a\,\mathrm{Sec}[c+dx]\right)$$
$$\sqrt{1-\mathrm{Sec}[c+dx]^2}\,\mathrm{Sin}[c+dx]\Big)\Big/\left(a\left(a+b\,\mathrm{Cos}[c+dx]\right)\left(1-\mathrm{Cos}[c+dx]^2\right)\right)+$$
$$\Big(\left(2a^2Ab-3Ab^3+ab^2B\right)\mathrm{Cos}[2(c+dx)]\left(b+a\,\mathrm{Sec}[c+dx]\right)\Big(-4ab+4ab\,\mathrm{Sec}[c+dx]^2-$$
$$4ab\,\mathrm{EllipticE}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+dx]}\Big],-1\Big]\sqrt{\mathrm{Sec}[c+dx]}\sqrt{1-\mathrm{Sec}[c+dx]^2}+$$
$$2(2a-b)b\,\mathrm{EllipticF}\Big[\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+dx]}\Big],-1\Big]\sqrt{\mathrm{Sec}[c+dx]}\sqrt{1-\mathrm{Sec}[c+dx]^2}+$$
$$4a^2\,\mathrm{EllipticPi}\Big[-\frac{a}{b},-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+dx]}\Big],-1\Big]\sqrt{\mathrm{Sec}[c+dx]}\sqrt{1-\mathrm{Sec}[c+dx]^2}-$$
$$2b^2\,\mathrm{EllipticPi}\Big[-\frac{a}{b},-\mathrm{ArcSin}\Big[\sqrt{\mathrm{Sec}[c+dx]}\Big],-1\Big]\sqrt{\mathrm{Sec}[c+dx]}\sqrt{1-\mathrm{Sec}[c+dx]^2}\Big)$$
$$\mathrm{Sin}[c+dx]\Big)\Big/\Big(ab^2\left(a+b\,\mathrm{Cos}[c+dx]\right)\left(1-\mathrm{Cos}[c+dx]^2\right)$$
$$\sqrt{\mathrm{Sec}[c+dx]}\left(2-\mathrm{Sec}[c+dx]^2\right)\Big)\Bigg)+$$
$$\frac{\sqrt{\mathrm{Sec}[c+dx]}\left(\frac{\left(2a^2A-3Ab^2+abB\right)\mathrm{Sin}[c+dx]}{a^2\left(a^2-b^2\right)}+\frac{Ab^2\,\mathrm{Sin}[c+dx]-abB\,\mathrm{Sin}[c+dx]}{a\left(a^2-b^2\right)\left(a+b\,\mathrm{Cos}[c+dx]\right)}\right)}{d}$$

Problem 574: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(A+B\,\mathrm{Cos}[c+dx]\right)\sqrt{\mathrm{Sec}[c+dx]}}{\left(a+b\,\mathrm{Cos}[c+dx]\right)^2}\,dx$$

Optimal (type 4, 260 leaves, 10 steps):

$$-\frac{(Ab-aB)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticE}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}}{a\left(a^2-b^2\right)d}-$$
$$\frac{(Ab-aB)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticF}\left[\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}}{b\left(a^2-b^2\right)d}+$$
$$\left(\left(3a^2Ab-Ab^3-a^3B-ab^2B\right)\sqrt{\mathrm{Cos}[c+dx]}\,\mathrm{EllipticPi}\left[\frac{2b}{a+b},\frac{1}{2}(c+dx),2\right]\sqrt{\mathrm{Sec}[c+dx]}\right)\Big/$$
$$\left(a(a-b)b(a+b)^2d\right)+\frac{b(Ab-aB)\sqrt{\mathrm{Sec}[c+dx]}\,\mathrm{Sin}[c+dx]}{a\left(a^2-b^2\right)d\left(b+a\,\mathrm{Sec}[c+dx]\right)}$$

Result (type 4, 645 leaves):

$$
\begin{aligned}
&\frac{1}{4\,a\,(-a+b)\,(a+b)\,d}\\
&\quad\Bigg(-\Bigg(\Bigg(2\,(4\,a\,A\,b-4\,a^2\,B)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\\
&\qquad\qquad(b+a\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\\
&\qquad\quad\left(b\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)\Bigg)+\\
&\quad\Bigg(2\,(-4\,a^2\,A+3\,A\,b^2+a\,b\,B)\,\text{Cos}[c+d\,x]^2\,\Bigg(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]+\\
&\qquad\quad\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\Bigg)\,(b+a\,\text{Sec}[c+d\,x])\\
&\qquad\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Bigg)\Big/\left(a\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\right)+\\
&\quad\Bigg(\left(A\,b^2-a\,b\,B\right)\,\text{Cos}[2\,(c+d\,x)]\,(b+a\,\text{Sec}[c+d\,x])\,\Bigg(-4\,a\,b+4\,a\,b\,\text{Sec}[c+d\,x]^2-\\
&\qquad\quad 4\,a\,b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+\\
&\qquad\quad 2\,(2\,a-b)\,b\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+\\
&\qquad\quad 4\,a^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-\\
&\qquad\quad 2\,b^2\,\text{EllipticPi}\left[-\frac{a}{b},\,-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d\,x]}\right],\,-1\right]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Bigg)\\
&\qquad\text{Sin}[c+d\,x]\Bigg)\Big/\Bigg(a\,b^2\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\\
&\qquad\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\Bigg)\Bigg)+\\
&\frac{\sqrt{\text{Sec}[c+d\,x]}\left(-\frac{(-A\,b+a\,B)\,\text{Sin}[c+d\,x]}{a\,(a^2-b^2)}+\frac{-A\,b\,\text{Sin}[c+d\,x]+a\,B\,\text{Sin}[c+d\,x]}{(a^2-b^2)\,(a+b\,\text{Cos}[c+d\,x])}\right)}{d}
\end{aligned}
$$

Problem 575: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{(a+b\,\text{Cos}[c+d\,x])^2\,\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 258 leaves, 10 steps):

$$
\begin{aligned}
&\frac{(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticE}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}}{b\,(a^2-b^2)\,d}+\frac{1}{b^2\,(a^2-b^2)\,d}\\
&\left(a\,A\,b+a^2\,B-2\,b^2\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticF}\left[\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}-\\
&\left(\left(a^2\,A\,b+A\,b^3+a^3\,B-3\,a\,b^2\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{EllipticPi}\left[\frac{2\,b}{a+b},\,\frac{1}{2}\,(c+d\,x),\,2\right]\,\sqrt{\text{Sec}[c+d\,x]}\right)\Big/\\
&\left((a-b)\,b^2\,(a+b)^2\,d\right)-\frac{(A\,b-a\,B)\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{(a^2-b^2)\,d\,(b+a\,\text{Sec}[c+d\,x])}
\end{aligned}
$$

Result (type 4, 632 leaves) :

$$\frac{1}{4\,(a-b)\,(a+b)\,d}\Bigg(-\bigg(\Big(2\,(4\,a\,A-4\,b\,B)\,\text{Cos}[c+d\,x]^2\,\text{EllipticPi}\Big[-\frac{a}{b},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,(b+a\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\Big(b\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\Big)\bigg)+$$
$$\Big(2\,(-A\,b+a\,B)\,\text{Cos}[c+d\,x]^2\,\Big(\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]+\text{EllipticPi}\Big[-\frac{a}{b},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\Big)\,(b+a\,\text{Sec}[c+d\,x])\,\sqrt{1-\text{Sec}[c+d\,x]^2}\,\text{Sin}[c+d\,x]\Big)\Big/\Big(a\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\Big)+$$
$$\bigg((A\,b-a\,B)\,\text{Cos}[2\,(c+d\,x)]\,(b+a\,\text{Sec}[c+d\,x])\,\Big(-4\,a\,b+4\,a\,b\,\text{Sec}[c+d\,x]^2-4\,a\,b\,\text{EllipticE}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$2\,(2\,a-b)\,b\,\text{EllipticF}\Big[\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}+$$
$$4\,a^2\,\text{EllipticPi}\Big[-\frac{a}{b},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}-$$
$$2\,b^2\,\text{EllipticPi}\Big[-\frac{a}{b},\,-\text{ArcSin}\Big[\sqrt{\text{Sec}[c+d\,x]}\Big],\,-1\Big]\,\sqrt{\text{Sec}[c+d\,x]}\,\sqrt{1-\text{Sec}[c+d\,x]^2}\Big)$$
$$\text{Sin}[c+d\,x]\bigg)\Big/\Big(a\,b^2\,(a+b\,\text{Cos}[c+d\,x])\,(1-\text{Cos}[c+d\,x]^2)\,\sqrt{\text{Sec}[c+d\,x]}\,(2-\text{Sec}[c+d\,x]^2)\Big)\Bigg)+$$
$$\frac{\sqrt{\text{Sec}[c+d\,x]}\left(\frac{(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{b\,(-a^2+b^2)}+\frac{-a\,A\,b\,\text{Sin}[c+d\,x]+a^2\,B\,\text{Sin}[c+d\,x]}{b\,(-a^2+b^2)\,(a+b\,\text{Cos}[c+d\,x])}\right)}{d}$$

Problem 576: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d\,x]}{(a+b\,\text{Cos}[c+d\,x])^2\,\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 284 leaves, 10 steps) :

$$-\frac{1}{b^2\left(a^2-b^2\right)d}\left(a A b-3 a^2 B+2 b^2 B\right)\sqrt{\text{Cos}[c+d x]}\;\text{EllipticE}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}+\frac{1}{b^3\left(a^2-b^2\right)d}\left(a^2 A b-2 A b^3-3 a^3 B+4 a b^2 B\right)\sqrt{\text{Cos}[c+d x]}\;\text{EllipticF}\left[\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}-\left(a\left(a^2 A b-3 A b^3-3 a^3 B+5 a b^2 B\right)\sqrt{\text{Cos}[c+d x]}\;\text{EllipticPi}\left[\frac{2 b}{a+b},\frac{1}{2}(c+d x),2\right]\sqrt{\text{Sec}[c+d x]}\right)\Big/\left((a-b)\,b^3\,(a+b)^2 d\right)+\frac{a\,(A b-a B)\sqrt{\text{Sec}[c+d x]}\;\text{Sin}[c+d x]}{b\left(a^2-b^2\right)d\,(b+a\,\text{Sec}[c+d x])}$$

Result (type 4, 661 leaves):

$$\frac{1}{4 b(-a+b)(a+b)d}\Bigg(-\Bigg(\Big(2\left(4 A b^2-4 a b B\right)\text{Cos}[c+d x]^2\,\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right](b+a\,\text{Sec}[c+d x])\sqrt{1-\text{Sec}[c+d x]^2}\;\text{Sin}[c+d x]\Big)\Big/\left(b\,(a+b\,\text{Cos}[c+d x])\left(1-\text{Cos}[c+d x]^2\right)\right)\Bigg)+\Bigg(2\left(-a A b-a^2 B+2 b^2 B\right)\text{Cos}[c+d x]^2\left(\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]+\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]\right)(b+a\,\text{Sec}[c+d x])\sqrt{1-\text{Sec}[c+d x]^2}\;\text{Sin}[c+d x]\Bigg)\Big/\left(a\,(a+b\,\text{Cos}[c+d x])\left(1-\text{Cos}[c+d x]^2\right)\right)+\Bigg(\left(a A b-3 a^2 B+2 b^2 B\right)\text{Cos}[2(c+d x)]\,(b+a\,\text{Sec}[c+d x])\Big(-4 a b+4 a b\,\text{Sec}[c+d x]^2-4 a b\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]\sqrt{\text{Sec}[c+d x]}\sqrt{1-\text{Sec}[c+d x]^2}+2(2 a-b)\,b\,\text{EllipticF}\left[\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]\sqrt{\text{Sec}[c+d x]}\sqrt{1-\text{Sec}[c+d x]^2}+4 a^2\,\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]\sqrt{\text{Sec}[c+d x]}\sqrt{1-\text{Sec}[c+d x]^2}-2 b^2\,\text{EllipticPi}\left[-\frac{a}{b},-\text{ArcSin}\left[\sqrt{\text{Sec}[c+d x]}\right],-1\right]\sqrt{\text{Sec}[c+d x]}\sqrt{1-\text{Sec}[c+d x]^2}\Big)\text{Sin}[c+d x]\Bigg)\Big/\left(a b^2\,(a+b\,\text{Cos}[c+d x])\left(1-\text{Cos}[c+d x]^2\right)\sqrt{\text{Sec}[c+d x]}\left(2-\text{Sec}[c+d x]^2\right)\right)\Bigg)+\frac{\sqrt{\text{Sec}[c+d x]}\left(-\frac{a(-A b+a B)\,\text{Sin}[c+d x]}{b^2\left(a^2-b^2\right)}+\frac{a^2 A b\,\text{Sin}[c+d x]-a^3 B\,\text{Sin}[c+d x]}{b^2\left(-a^2+b^2\right)(a+b\,\text{Cos}[c+d x])}\right)}{d}$$

Problem 590: Attempted integration timed out after 120 seconds.

$$\int\sqrt{a+b\,\text{Cos}[c+d x]}\;(A+B\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{9/2}\,dx$$

Optimal (type 4, 473 leaves, 7 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(19\,a^2\,A\,b+8\,A\,b^3+63\,a^3\,B-14\,a\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(105\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^2+a^2\,(25\,A-63\,B)+2\,a\,b\,(3\,A-7\,B)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(105\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{1}{105\,a^2\,d}2\,\left(25\,a^2\,A-4\,A\,b^2+7\,a\,b\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+\frac{2\,(A\,b+7\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{35\,a\,d}+\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 1, 1 leaves):

???

Problem 591: Unable to integrate problem.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\;(A+B\,\text{Cos}[c+d\,x])\;\text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 4, 390 leaves, 6 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(9\,a^2\,A-2\,A\,b^2+5\,a\,b\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(15\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,(9\,a\,A+2\,A\,b-5\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\right.\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(15\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\,(A\,b+5\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a\,d}+$$

$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 8, 37 leaves) :

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^{7/2}\,dx$$

Problem 592: Attempted integration timed out after 120 seconds.

$$\int\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]\right)\,\text{Sec}[c+d\,x]^{5/2}\,dx$$

Optimal (type 4, 324 leaves, 5 steps) :

$$\left(2\,(a-b)\,\sqrt{a+b}\,(A\,b+3\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,(A-3\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(3\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,d}$$

Result (type 1, 1 leaves):

???

Problem 595: Result more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,(A+B\,\text{Cos}[c+d\,x])}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 533 leaves, 8 steps):

$$-\Bigg(\Bigg(\left(a-b\right)\sqrt{a+b}\,\left(4\,A\,b+a\,B\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\Bigg)\Bigg/\left(4\,a\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\Bigg)+$$

$$\Bigg(\sqrt{a+b}\,\left(4\,A\,b+\left(a+2\,b\right)B\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\Bigg)\Bigg/\left(4\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\Bigg(\sqrt{a+b}\,\left(4\,a\,A\,b-a^2\,B+4\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\Big[\frac{a+b}{b},\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\left(1-\text{Sec}[c+d\,x]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}[c+d\,x]\right)}{a-b}}\Bigg)\Bigg/$$

$$\left(4\,b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{\left(4\,A\,b+a\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,b\,d}$$

Result (type 4, 1133 leaves):

$$\frac{B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}\left[2\left(c+d\,x\right)\right]}{4\,d}+\frac{1}{4\,b\,d\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}}$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\,\Bigg(4\,a\,A\,b\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]+4\,A\,b^2\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]+a^2\,B\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]+$$

$$a\,b\,B\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]-8\,A\,b^2\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]^3-2\,a\,b\,B\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]^3-$$

$$4\,a\,A\,b\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]^5+4\,A\,b^2\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]^5-a^2\,B\,\text{Tan}\Big[\frac{1}{2}\left(c+d\,x\right)\Big]^5+$$

$$a\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5 - 8\,a\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,a^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$8\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$8\,a\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,a^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$8\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$(a+b)\,(4\,A\,b+a\,B)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$2\,b\,(4\,a\,A-a\,B+2\,b\,B)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\,\Bigg)$$

Problem 596: Result more than twice size of optimal antiderivative.

$$\int\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\left(A+B\,\text{Cos}[c+d\,x]\right)}{\text{Sec}[c+d\,x]^{3/2}}\,dx$$

Optimal (type 4, 620 leaves, 9 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,\left(6\,a\,A\,b-3\,a^2\,B+16\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,a\,b^2\,d\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$

$$\left(\sqrt{a+b}\,(a+2\,b)\,(6\,A\,b-3\,a\,B+8\,b\,B)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,b^2\,d\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(\sqrt{a+b}\,\left(2\,a^2\,A\,b-8\,A\,b^3-a^3\,B-4\,a\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(8\,b^3\,d\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{(2\,A\,b-a\,B)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,b\,d\sqrt{\text{Sec}[c+d\,x]}}+\frac{B\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,b\,d\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{1}{24\,b^2\,d}\left(6\,a\,A\,b-3\,a^2\,B+16\,b^2\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]$$

Result (type 4, 2679 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}\left(\frac{1}{12}\,B\,\text{Sin}[c+d\,x]+\frac{(6\,A\,b+a\,B)\,\text{Sin}[2\,(c+d\,x)]}{24\,b}+\frac{1}{12}\,B\,\text{Sin}[3\,(c+d\,x)]\right)+$$

$$\left(\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(\frac{A\,b}{2\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}}+\right.\right.$$

$$\frac{7\,a\,B}{12\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{3\,a\,A\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\frac{a^2\,B\,\sqrt{\text{Sec}[c+d\,x]}}{48\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{b\,B\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{a\,A\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-$$

$$\left.\frac{a^2\,B\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{16\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{b\,B\,\text{Cos}\left[2\,\left(c+d\,x\right)\right]\,\sqrt{\text{Sec}[c+d\,x]}}{3\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\right)$$

$$\left(-\frac{\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\sqrt{\text{Sec}[c+d\,x]}}+\right.$$

$$\left(\left(\left(a+b\right)\,\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(-6\,a\,A\,b+12\,A\,b^2-a^2\,B+14\,a\,b\,B\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$6\,\left(-2\,a^2\,A\,b+8\,A\,b^3+a^3\,B+4\,a\,b^2\,B\right)\,\text{EllipticPi}\left[-1,\right.$$

$$\left.\left.-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\right)\,\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^4}\right)\Big/$$

$$\left(\left(a+b\right)\,\sqrt{\frac{\left(a+b\,\text{Cos}[c+d\,x]\right)\,\text{Sec}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}\,\sqrt{\text{Cos}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\,\text{Sec}[c+d\,x]}\right.$$

$$\left.\left.\left.\left(-1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2\right)\right)\right)\right)\Big/$$

$$\left(24\,b^2\,d\,\left(-\left(\left(\text{Sin}[c+d\,x]\,\left(-\frac{\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]}{\sqrt{\text{Sec}[c+d\,x]}}+\right.\right.\right.\right.\right.$$

$$\left(\left(\left(a+b\right)\,\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\,\left(-6\,a\,A\,b+12\,A\,b^2-a^2\,B+14\,a\,b\,B\right)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\,\left(-2\,a^2\,A\,b+8\,A\,b^3+a^3\,B+4\,a\,b^2\,B\right)\,\text{EllipticPi}\left[-1,\right.$$

$$-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{-a+b}{a+b}\right]\right)\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\Bigg)\Big/$$

$$\left((a+b)\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\ \sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\right.$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\right)\right)\right)\Big/\left(48\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\right)\Bigg)+$$

$$\frac{1}{24\,b^2}\sqrt{a+b\,\text{Cos}[c+d\,x]}\left(-\frac{\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{2\,\sqrt{\text{Sec}[c+d\,x]}}+\right.$$

$$\frac{1}{2}\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\sqrt{\text{Sec}[c+d\,x]}\ \text{Sin}[c+d\,x]\ \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$\left(\left((a+b)\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{-a+b}{a+b}\right]+2\right.\right.$$

$$b\left(-6\,a\,A\,b+12\,A\,b^2-a^2\,B+14\,a\,b\,B\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\left(-2\,a^2\,A\,b+8\,A\,b^3+a^3\,B+4\,a\,b^2\,B\right)\text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\right.\right.\right.$$

$$\left.\left.\left.\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{-a+b}{a+b}\right]\right)\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\sqrt{\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4}$$

$$\left.\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right)\Big/\left((a+b)\sqrt{\frac{(a+b\,\text{Cos}[c+d\,x])\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right.$$

$$\left.\sqrt{\text{Cos}\left[\frac{1}{2}\,(c+d\,x)\right]^2\text{Sec}[c+d\,x]}\ \left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^2\right)-$$

$$\left(\left((a+b)\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\ \frac{-a+b}{a+b}\right]+\right.\right.$$

$$2\,b\left(-6\,a\,A\,b+12\,A\,b^2-a^2\,B+14\,a\,b\,B\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\left(-2\,a^2\,A\,b+8\,A\,b^3+a^3\,B+4\,a\,b^2\,B\right)\text{EllipticPi}\Big[-1,$$

$$-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\Big)\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4}$$

$$\left(-\frac{b\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\text{Sin}[c+d x]}{a+b}+\frac{1}{a+b}(a+b\,\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\right.$$

$$\left.\left.\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\right)\Bigg/\left(2(a+b)\left(\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right)^{3/2}\right.$$

$$\left.\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+$$

$$\Big(\Big((a+b)\left(-6 a A b+3 a^2 B-16 b^2 B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+2 b\left(-6 a A b+12 A b^2-a^2 B+14 a b B\right)\text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\Big]+6\left(-2 a^2 A b+8 A b^3+a^3 B+4 a b^2 B\right)$$

$$\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\Big)\left(-\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\right.$$

$$\left.\text{Sin}[c+d x]+2\,\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)\Big)\Bigg/$$

$$\left(2(a+b)\sqrt{\frac{(a+b\,\text{Cos}[c+d x])\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4}\right.$$

$$\sqrt{\text{Cos}\left[\frac{1}{2}(c+d x)\right]^2\text{Sec}[c+d x]}$$

$$\left.\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)+\left(\sqrt{\text{Cos}[c+d x]\,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^4}\right.$$

$$\left(\frac{b\left(-6 a A b+12 A b^2-a^2 B+14 a b B\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2}{\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{1-\frac{(-a+b)\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}}-\Big(3\left(-2 a^2 A b+\right.\right.$$

$$\left.8 A b^3+a^3 B+4 a b^2 B\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2\Big)\Bigg/\left(\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\right.$$

$$\left(1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\sqrt{1-\frac{\left(-a+b\right)\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\Bigg)+$$

$$\Bigg(\left(a+b\right)\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\frac{\left(-a+b\right)\,\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\Bigg)\Bigg/\left(2\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\right)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(\left(a+b\right)\sqrt{\frac{\left(a+b\,\mathrm{Cos}\left[c+d\,x\right]\right)\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\,\sqrt{\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\,\mathrm{Sec}\left[c+d\,x\right]}$$

$$\left(-1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\Bigg)-$$

$$\Bigg(\Bigg(\left(a+b\right)\left(-6\,a\,A\,b+3\,a^2\,B-16\,b^2\,B\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$2\,b\left(-6\,a\,A\,b+12\,A\,b^2-a^2\,B+14\,a\,b\,B\right)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\right.$$

$$\left.\frac{-a+b}{a+b}\right]+6\left(-2\,a^2\,A\,b+8\,A\,b^3+a^3\,B+4\,a\,b^2\,B\right)\,\mathrm{EllipticPi}\left[-1,\right.$$

$$\left.-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\Bigg)\sqrt{\mathrm{Cos}\left[c+d\,x\right]\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^4}$$

$$\left(-\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]\,\mathrm{Sec}\left[c+d\,x\right]\,\mathrm{Sin}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right.$$

$$\left.\mathrm{Sec}\left[c+d\,x\right]\,\mathrm{Tan}\left[c+d\,x\right]\right)\Bigg)\Bigg/\Bigg(2\left(a+b\right)\sqrt{\frac{\left(a+b\,\mathrm{Cos}\left[c+d\,x\right]\right)\,\mathrm{Sec}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}$$

$$\left(\mathrm{Cos}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\,\mathrm{Sec}\left[c+d\,x\right]\right)^{3/2}\left(-1+\mathrm{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Problem 597: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{11/2}\,dx$$

Optimal (type 4, 562 leaves, 8 steps):

$$\Bigg(2\,(a-b)\,\sqrt{a+b}\,\left(147\,a^4\,A+33\,a^2\,A\,b^2+8\,A\,b^4+246\,a^3\,b\,B-18\,a\,b^3\,B\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Big/\left(315\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\Bigg(2\,(a-b)\,\sqrt{a+b}\,\left(8\,A\,b^3-a^3\,(147\,A-75\,B)+3\,a^2\,b\,(13\,A-57\,B)+6\,a\,b^2\,(A-3\,B)\right)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\Bigg)\Big/\left(315\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{1}{315\,a^2\,d}$$

$$2\,\left(88\,a^2\,A\,b-4\,A\,b^3+75\,a^3\,B+9\,a\,b^2\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{1}{315\,a\,d}2\,\left(49\,a^2\,A+3\,A\,b^2+72\,a\,b\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]+$$

$$\frac{2\,(10\,A\,b+9\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{63\,d}+$$

$$\frac{2\,a\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{9/2}\,\text{Sin}[c+d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

Problem 598: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{9/2}\,dx$$

Optimal (type 4, 473 leaves, 7 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(82\,a^2\,A\,b-6\,A\,b^3+63\,a^3\,B+21\,a\,b^2\,B\right)\right.$$
$$\sqrt{\text{Cos}[c+d\,x]}\ \text{Csc}[c+d\,x]\ \text{EllipticE}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\ -\frac{a+b}{a-b}\Big]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$
$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(6\,A\,b^2-a^2\,(25\,A-63\,B)+3\,a\,b\,(19\,A-7\,B)\right)\,\sqrt{\text{Cos}[c+d\,x]}\right.$$
$$\text{Csc}[c+d\,x]\ \text{EllipticF}\Big[\text{ArcSin}\Big[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\Big],\ -\frac{a+b}{a-b}\Big]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(105\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$
$$\frac{1}{105\,a\,d}2\,\left(25\,a^2\,A+3\,A\,b^2+42\,a\,b\,B\right)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]+$$
$$\frac{2\,(8\,A\,b+7\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{35\,d}+$$
$$\frac{2\,a\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\ \text{Sec}[c+d\,x]^{7/2}\,\text{Sin}[c+d\,x]}{7\,d}$$

Result (type 1, 1 leaves):

???

Problem 599: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x])\ \text{Sec}[c+d\,x]^{7/2}\,dx$$

Optimal (type 4, 393 leaves, 6 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(9\,a^2\,A+3\,A\,b^2+20\,a\,b\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(15\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\,(a-b)\,\sqrt{a+b}\,(9\,a\,A-3\,A\,b-5\,a\,B+15\,b\,B)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(15\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{2\,(6\,A\,b+5\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,d}+$$
$$\frac{2\,a\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,d}$$

Result (type 1, 1 leaves):

???

Problem 602: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x])\,\sqrt{\text{Sec}[c+d\,x]}\;dx$$

Optimal (type 4, 532 leaves, 8 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,(4\,A\,b+5\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\right.\right.$$
$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left.\left(4\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$
$$\left(\sqrt{a+b}\,(8\,a\,A+4\,A\,b+5\,a\,B+2\,b\,B)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\right.$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$
$$\left(\sqrt{a+b}\,\left(12\,a\,A\,b+3\,a^2\,B+4\,b^2\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\right.\right.$$
$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$
$$\left(4\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{b\,B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sin}[c+d\,x]}{2\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$
$$\frac{(4\,A\,b+5\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{4\,d}$$

Result (type 4, 1146 leaves) :

$$\frac{b\,B\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[2\,(c+d\,x)]}{4\,d}+$$
$$\frac{1}{4\,d\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}$$
$$\left(4\,a\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+5\,a^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+\right.$$

$$5\,a\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-8\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-10\,a\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$4\,a\,A\,b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+4\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-5\,a^2\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$5\,a\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-24\,a\,A\,b\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$6\,a^2\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$8\,b^2\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$24\,a\,A\,b\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$6\,a^2\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$8\,b^2\,B\,\mathrm{EllipticPi}\left[-1,\,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$(a+b)\,(4\,A\,b+5\,a\,B)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$2\,\left(4\,a^2\,(A-B)-2\,b^2\,B+a\,b\,(-8\,A+B)\right)\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;\right)$$

Problem 603: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d\,x])^{3/2}\,(A+B\,\text{Cos}[c+d\,x])}{\sqrt{\text{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 626 leaves, 9 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,a\,b\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)\right)+$$

$$\left(\sqrt{a+b}\,(30\,a\,A\,b+12\,A\,b^2+3\,a^2\,B+14\,a\,b\,B+16\,b^2\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,b\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)-$$

$$\left(\sqrt{a+b}\,(6\,a^2\,A\,b+8\,A\,b^3-a^3\,B+12\,a\,b^2\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\;\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticPi}\left[\frac{a+b}{b},\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(8\,b^2\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)+$$

$$\frac{b\,B\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{3\,d\,\mathrm{Sec}[c+d\,x]^{3/2}}+\frac{(6\,A\,b+7\,a\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]}{12\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}}+$$

$$\frac{1}{24\,b\,d}(30\,a\,A\,b+3\,a^2\,B+16\,b^2\,B)\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\;\mathrm{Sin}[c+d\,x]$$

Result (type 4, 1505 leaves):

$$\frac{1}{d}\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}\,\sqrt{\mathrm{Sec}[c+d\,x]}\left(\frac{1}{12}\,b\,B\,\mathrm{Sin}[c+d\,x]+\frac{1}{24}\,(6\,A\,b+7\,a\,B)\,\mathrm{Sin}[2\,(c+d\,x)]+\frac{1}{12}\,b\,B\,\mathrm{Sin}[3\,(c+d\,x)]\right)+$$

$$\frac{1}{24\,b\,d\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\;\left(30\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+30\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\right.$$

$$3\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+3\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+16\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+$$

$$16\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-60\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-6\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-$$

$$32\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-30\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+30\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-$$

$$3\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+3\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-16\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+$$

$$16\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-36\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$48\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;+$$

$$6\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$72\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$36\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;-$$

$$48\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\;+$$

$$6 a^3 B \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$
$$72 a b^2 B \,\text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} +$$
$$(a+b)\left(30 a A b+3 a^2 B+16 b^2 B\right) \text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$
$$\sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}} -$$
$$2 b\left(12 A b^2+a^2(24 A-7 B)+a(-6 A b+26 b B)\right)$$
$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$
$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\;\Bigg)$$

Problem 604: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b \,\text{Cos}[c+d x])^{3/2}(A+B \,\text{Cos}[c+d x])}{\text{Sec}[c+d x]^{3/2}} \, dx$$

Optimal (type 4, 730 leaves, 10 steps):

$$-\left(\left(\left(a-b\right)\sqrt{a+b}\left(24 a^2 A b+128 A b^3-9 a^3 B+156 a b^2 B\right)\right.\right.$$

$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(192 a b^2 d\sqrt{\text{Sec}[c+d x]}\right)\right)-$$

$$\left(\sqrt{a+b}\left(9 a^3 B-6 a^2 b\,(4 A+B)-8 b^3\left(16 A+9 B\right)-4 a b^2\left(28 A+39 B\right)\right)\sqrt{\text{Cos}[c+d x]}\right.$$

$$\text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(192 b^2 d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(\sqrt{a+b}\left(8 a^3 A b-96 a A b^3-3 a^4 B-24 a^2 b^2 B-48 b^4 B\right)\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\right.$$

$$\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(64 b^3 d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\frac{\left(8 a A b-3 a^2 B+12 b^2 B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{32 b d\sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{\left(8 A b-3 a B\right)\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}\text{Sin}[c+d x]}{24 b d\sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{B\left(a+b\,\text{Cos}[c+d x]\right)^{5/2}\text{Sin}[c+d x]}{4 b d\sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{1}{192 b^2 d}$$

$$\left(24 a^2 A b+128 A b^3-9 a^3 B+156 a b^2 B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 4, 1907 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}$$

$$\left(\frac{1}{96}\left(8 A b+9 a B\right)\text{Sin}[c+d x]+\frac{\left(56 a A b+3 a^2 B+48 b^2 B\right)\text{Sin}\left[2\left(c+d x\right)\right]}{192 b}+\right.$$

$$\frac{1}{96}\left(8\,A\,b+9\,a\,B\right)\,\text{Sin}\left[3\,\left(c+d\,x\right)\right]+\frac{1}{32}\,b\,B\,\text{Sin}\left[4\,\left(c+d\,x\right)\right]\Bigg)+$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}}\right.$$

$$\left(-24\,a^3\,A\,b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-24\,a^2\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-128\,a\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-\right.$$

$$128\,A\,b^4\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+9\,a^4\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+9\,a^3\,b\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-$$

$$156\,a^2\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]-156\,a\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]+48\,a^2\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3+$$

$$256\,A\,b^4\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3-18\,a^3\,b\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3+312\,a\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^3+$$

$$24\,a^3\,A\,b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-24\,a^2\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+128\,a\,A\,b^3\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-$$

$$128\,A\,b^4\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-9\,a^4\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+9\,a^3\,b\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5+$$

$$156\,a^2\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-156\,a\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^5-$$

$$48\,a^3\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$576\,a\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$18\,a^4\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$144\,a^2\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$288\,b^4\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,\left(c+d\,x\right)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$48\,a^3\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$576\,a\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$18\,a^4\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$144\,a^2\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$288\,b^4\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$(a+b)\left(-24\,a^2\,A\,b-128\,A\,b^3+9\,a^3\,B-156\,a\,b^2\,B\right)$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2\,b\left(2\,a^2\,b\,(28\,A-57\,B)-4\,a\,b^2\,(52\,A-9\,B)+3\,a^3\,B-72\,b^3\,B\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(192 b^2 d\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(b\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 605: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\text{Cos}[c+d x])^{5/2}(A+B\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{13/2}\,dx$$

Optimal (type 4, 662 leaves, 9 steps):

$$\Bigg(2(a-b)\sqrt{a+b}\left(3705 a^4 A b+255 a^2 A b^3+40 A b^5+1617 a^5 B+3069 a^3 b^2 B-110 a b^4 B\right)$$
$$\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}\Bigg)\Bigg/\left(3465 a^4 d\sqrt{\text{Sec}[c+d x]}\right)+\Bigg(2(a-b)\sqrt{a+b}$$
$$\left(40 A b^4+3 a^4(225 A-539 B)-6 a^3 b(505 A-209 B)+15 a^2 b^2(19 A-121 B)+10 a b^3(3 A-11 B)\right)$$
$$\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\sqrt{\frac{a(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a(1+\text{Sec}[c+d x])}{a-b}}\Bigg)\Bigg/\left(3465 a^3 d\sqrt{\text{Sec}[c+d x]}\right)+$$
$$\frac{1}{3465 a^2 d}2\left(675 a^4 A+1025 a^2 A b^2-20 A b^4+1793 a^3 b B+55 a b^3 B\right)$$
$$\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x]+\frac{1}{3465 a d}$$
$$2\left(1145 a^2 A b+15 A b^3+539 a^3 B+825 a b^2 B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]+$$
$$\frac{1}{693 d}2\left(81 a^2 A+113 A b^2+209 a b B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]^{7/2}\,\text{Sin}[c+d x]+$$
$$\frac{2 a(14 A b+11 a B)\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sec}[c+d x]^{9/2}\,\text{Sin}[c+d x]}{99 d}+$$
$$\frac{2 a A(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sec}[c+d x]^{11/2}\,\text{Sin}[c+d x]}{11 d}$$

Result (type 1, 1 leaves):

???

Problem 606: Attempted integration timed out after 120 seconds.

$$\int (a + b\,\text{Cos}[c + d\,x])^{5/2}\,(A + B\,\text{Cos}[c + d\,x])\,\text{Sec}[c + d\,x]^{11/2}\,dx$$

Optimal (type 4, 562 leaves, 8 steps):

$$\left(2\,(a - b)\,\sqrt{a + b}\,\left(147\,a^4\,A + 279\,a^2\,A\,b^2 - 10\,A\,b^4 + 435\,a^3\,b\,B + 45\,a\,b^3\,B\right)\right.$$
$$\sqrt{\text{Cos}[c + d\,x]}\,\,\text{Csc}[c + d\,x]\,\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a + b}\,\sqrt{\text{Cos}[c + d\,x]}}\right], -\frac{a + b}{a - b}\right]$$
$$\left.\sqrt{\frac{a\,(1 - \text{Sec}[c + d\,x])}{a + b}}\,\sqrt{\frac{a\,(1 + \text{Sec}[c + d\,x])}{a - b}}\right) \Big/ \left(315\,a^3\,d\,\sqrt{\text{Sec}[c + d\,x]}\right) -$$
$$\left(2\,(a - b)\,\sqrt{a + b}\,\left(10\,A\,b^3 - 6\,a^2\,b\,(19\,A - 60\,B) + 3\,a^3\,(49\,A - 25\,B) + 15\,a\,b^2\,(11\,A - 3\,B)\right)\right.$$
$$\sqrt{\text{Cos}[c + d\,x]}\,\,\text{Csc}[c + d\,x]\,\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a + b\,\text{Cos}[c + d\,x]}}{\sqrt{a + b}\,\sqrt{\text{Cos}[c + d\,x]}}\right], -\frac{a + b}{a - b}\right]$$
$$\left.\sqrt{\frac{a\,(1 - \text{Sec}[c + d\,x])}{a + b}}\,\sqrt{\frac{a\,(1 + \text{Sec}[c + d\,x])}{a - b}}\right) \Big/ \left(315\,a^2\,d\,\sqrt{\text{Sec}[c + d\,x]}\right) + \frac{1}{315\,a\,d}$$
$$2\,\left(163\,a^2\,A\,b + 5\,A\,b^3 + 75\,a^3\,B + 135\,a\,b^2\,B\right)\,\sqrt{a + b\,\text{Cos}[c + d\,x]}\,\,\text{Sec}[c + d\,x]^{3/2}\,\text{Sin}[c + d\,x] +$$
$$\frac{1}{315\,d}2\,\left(49\,a^2\,A + 75\,A\,b^2 + 135\,a\,b\,B\right)\,\sqrt{a + b\,\text{Cos}[c + d\,x]}\,\,\text{Sec}[c + d\,x]^{5/2}\,\text{Sin}[c + d\,x] +$$
$$\frac{2\,a\,(4\,A\,b + 3\,a\,B)\,\sqrt{a + b\,\text{Cos}[c + d\,x]}\,\,\text{Sec}[c + d\,x]^{7/2}\,\text{Sin}[c + d\,x]}{21\,d} +$$
$$\frac{2\,a\,A\,(a + b\,\text{Cos}[c + d\,x])^{3/2}\,\text{Sec}[c + d\,x]^{9/2}\,\text{Sin}[c + d\,x]}{9\,d}$$

Result (type 1, 1 leaves):

???

Problem 607: Attempted integration timed out after 120 seconds.

$$\int (a + b\,\text{Cos}[c + d\,x])^{5/2}\,(A + B\,\text{Cos}[c + d\,x])\,\text{Sec}[c + d\,x]^{9/2}\,dx$$

Optimal (type 4, 474 leaves, 7 steps):

$$\left(2 (a-b) \sqrt{a+b} \left(145 a^2 A b + 15 A b^3 + 63 a^3 B + 161 a b^2 B\right)\right.$$
$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right) \Big/ \left(105 a^2 d \sqrt{\text{Sec}[c+d x]}\right) +$$
$$\left(2 (a-b) \sqrt{a+b} \left(a^2 (25 A - 63 B) + 15 b^2 (A - 7 B) - 8 a b (15 A - 7 B)\right) \sqrt{\text{Cos}[c+d x]}\right.$$
$$\text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right) \Big/ \left(105 a d \sqrt{\text{Sec}[c+d x]}\right) +$$
$$\frac{1}{105 d} 2 \left(25 a^2 A + 45 A b^2 + 77 a b B\right) \sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sec}[c+d x]^{3/2}\,\text{Sin}[c+d x] +$$
$$\frac{2 a (10 A b + 7 a B) \sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sec}[c+d x]^{5/2}\,\text{Sin}[c+d x]}{35 d} +$$
$$\frac{2 a A \left(a+b\,\text{Cos}[c+d x]\right)^{3/2}\,\text{Sec}[c+d x]^{7/2}\,\text{Sin}[c+d x]}{7 d}$$

Result (type 1, 1 leaves):

???

Problem 610: Result more than twice size of optimal antiderivative.

$$\int \left(a+b\,\text{Cos}[c+d x]\right)^{5/2} \left(A+B\,\text{Cos}[c+d x]\right) \text{Sec}[c+d x]^{3/2}\, dx$$

Optimal (type 4, 607 leaves, 9 steps):

$$\left((a-b)\sqrt{a+b}\left(8a^2A-4Ab^2-9abB\right)\sqrt{\text{Cos}[c+dx]}\right.$$

$$\text{Csc}[c+dx]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+dx])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+dx])}{a-b}}\right)\Bigg/\left(4ad\sqrt{\text{Sec}[c+dx]}\right)-$$

$$\left(\sqrt{a+b}\left(8a^2(A-B)-2b^2(2A+B)-3ab(8A+3B)\right)\sqrt{\text{Cos}[c+dx]}\right.$$

$$\text{Csc}[c+dx]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+dx])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+dx])}{a-b}}\right)\Bigg/\left(4d\sqrt{\text{Sec}[c+dx]}\right)-$$

$$\left(\sqrt{a+b}\left(20aAb+15a^2B+4b^2B\right)\sqrt{\text{Cos}[c+dx]}\,\text{Csc}[c+dx]\,\text{EllipticPi}\left[\frac{a+b}{b},\right.\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+dx])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+dx])}{a-b}}\right)\Bigg/$$

$$\left(4d\sqrt{\text{Sec}[c+dx]}\right)-\frac{b\,(4aA-bB)\sqrt{a+b\,\text{Cos}[c+dx]}\,\text{Sin}[c+dx]}{2d\sqrt{\text{Sec}[c+dx]}}-\frac{1}{4d}$$

$$\left(8a^2A-4Ab^2-9abB\right)\sqrt{a+b\,\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]+$$

$$\frac{2aA\,(a+b\,\text{Cos}[c+dx])^{3/2}\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{d}$$

Result (type 4, 1290 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+dx]}\,\sqrt{\text{Sec}[c+dx]}\left(2a^2A\,\text{Sin}[c+dx]+\frac{1}{4}b^2B\,\text{Sin}[2\,(c+dx)]\right)+$$

$$\frac{1}{4d\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}}$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\left(-8a^3A\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]-8a^2Ab\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]+\right.$$

$$4\,a\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+4\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+9\,a^2\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$9\,a\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+16\,a^2\,A\,b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-8\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$18\,a\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+8\,a^3\,A\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-8\,a^2\,A\,b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$4\,a\,A\,b^2\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+4\,A\,b^3\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-9\,a^2\,b\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$9\,a\,b^2\,B\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-40\,a\,A\,b^2\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$30\,a^2\,b\,B\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$8\,b^3\,B\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$40\,a\,A\,b^2\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$30\,a^2\,b\,B\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$8\,b^3\,B\,\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$(a+b)\,\left(8\,a^2\,A-4\,A\,b^2-9\,a\,b\,B\right)\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,\left(12\,a^2\,b\,(A-B)-2\,b^3\,B+a\,b^2\,(-12\,A+B)+4\,a^3\,(A+B)\right)$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)$$

Problem 611: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\mathrm{Cos}[c+d\,x])^{5/2}\,(A+B\,\mathrm{Cos}[c+d\,x])\,\sqrt{\mathrm{Sec}[c+d\,x]}\,dx$$

Optimal (type 4, 624 leaves, 9 steps):

$$-\left(\left((a-b)\sqrt{a+b}\left(54\,a\,A\,b+33\,a^2\,B+16\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,a\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$

$$\left(\sqrt{a+b}\left(4\,b^2\,(3\,A+4\,B)+a^2\,(48\,A+33\,B)+a\,(54\,A\,b+26\,b\,B)\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(24\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(\sqrt{a+b}\left(30\,a^2\,A\,b+8\,A\,b^3+5\,a^3\,B+20\,a\,b^2\,B\right)\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(8\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{b\,(2\,A\,b+3\,a\,B)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sin}[c+d\,x]}{4\,d\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{b\,B\,(a+b\,\text{Cos}[c+d\,x])^{3/2}\,\text{Sin}[c+d\,x]}{3\,d\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{1}{24\,d}\left(54\,a\,A\,b+33\,a^2\,B+16\,b^2\,B\right)\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]$$

Result (type 4, 1521 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}$$

$$\left(\frac{1}{12}\,b^2\,B\,\text{Sin}[c+d\,x]+\frac{1}{24}\,b\,(6\,A\,b+13\,a\,B)\,\text{Sin}[2\,(c+d\,x)]+\frac{1}{12}\,b^2\,B\,\text{Sin}[3\,(c+d\,x)]\right)-$$

$$\frac{1}{24\,d\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}}$$

$$\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\Bigg(-54\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-54\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$33\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-33\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-16\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$16\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+108\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+66\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+$$

$$32\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+54\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-54\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$33\,a^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-33\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+16\,a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$16\,b^3\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+180\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$48\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$30\,a^3\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$120\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$180\,a^2\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$48\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$30\,a^3\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$120\,a\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$(a+b)\left(54\,a\,A\,b+33\,a^2\,B+16\,b^2\,B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2\left(-12\,A\,b^3+2\,a\,b^2\,(3\,A-19\,B)+24\,a^3\,(A-B)+a^2\,(-72\,A\,b+13\,b\,B)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)$$

Problem 612: Result more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{Cos}[c+d x])^{5/2}\,(A+B\,\text{Cos}[c+d x])}{\sqrt{\text{Sec}[c+d x]}}\,dx$$

Optimal (type 4, 724 leaves, 10 steps):

$$-\left(\left((a-b)\sqrt{a+b}\left(264 a^2 A b+128 A b^3+15 a^3 B+284 a b^2 B\right)\right.\right.$$
$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(192\, a\, b\, d \sqrt{\text{Sec}[c+d x]}\right)\right)+$$
$$\left(\sqrt{a+b}\left(15 a^3 B+8 b^3 (16 A+9 B)+2 a^2 b (132 A+59 B)+4 a b^2 (52 A+71 B)\right)\right.$$
$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(192\, b\, d \sqrt{\text{Sec}[c+d x]}\right)-$$
$$\left(\sqrt{a+b}\left(40 a^3 A b+160 a A b^3-5 a^4 B+120 a^2 b^2 B+48 b^4 B\right)\sqrt{\text{Cos}[c+d x]}\right.$$
$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$
$$\left.\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/$$
$$\left(64 b^2 d \sqrt{\text{Sec}[c+d x]}\right)+\frac{b B\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}\text{Sin}[c+d x]}{4 d\,\text{Sec}[c+d x]^{3/2}}+$$
$$\frac{\left(24 a A b+5 a^2 B+12 b^2 B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]}{32 d \sqrt{\text{Sec}[c+d x]}}+$$
$$\frac{(8 A b+11 a B)\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}\text{Sin}[c+d x]}{24 d \sqrt{\text{Sec}[c+d x]}}+$$
$$\frac{1}{192\, b\, d}\left(264 a^2 A b+128 A b^3+15 a^3 B+284 a b^2 B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 4, 1877 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}$$

$$\left(\frac{1}{96} b \left(8 A b + 17 a B\right) \text{Sin}[c + d x] + \frac{1}{192} \left(104 a A b + 59 a^2 B + 48 b^2 B\right) \text{Sin}\left[2 \left(c + d x\right)\right] + \frac{1}{96} b \left(8 A b + 17 a B\right) \text{Sin}\left[3 \left(c + d x\right)\right] + \frac{1}{32} b^2 B \text{Sin}\left[4 \left(c + d x\right)\right]\right) +$$

$$\frac{1}{192 b d \left(1 + \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2\right)^{3/2} \sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2} (c+d x)\right]^2}}}$$

$$\sqrt{\frac{1}{1 - \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2}} \left(264 a^3 A b \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right] + 264 a^2 A b^2 \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right] + \right.$$

$$128 a A b^3 \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right] + 128 A b^4 \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right] + 15 a^4 B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right] +$$

$$15 a^3 b B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right] + 284 a^2 b^2 B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right] + 284 a b^3 B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right] -$$

$$528 a^2 A b^2 \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^3 - 256 A b^4 \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^3 - 30 a^3 b B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^3 -$$

$$568 a b^3 B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^3 - 264 a^3 A b \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^5 + 264 a^2 A b^2 \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^5 -$$

$$128 a A b^3 \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^5 + 128 A b^4 \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^5 - 15 a^4 B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^5 +$$

$$15 a^3 b B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^5 - 284 a^2 b^2 B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^5 + 284 a b^3 B \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^5 -$$

$$240 a^3 A b \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]\right], \frac{-a + b}{a + b}\right]$$

$$\sqrt{1 - \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2} \sqrt{\frac{a + b + a \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2 - b \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2}{a + b}} -$$

$$960 a A b^3 \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]\right], \frac{-a + b}{a + b}\right]$$

$$\sqrt{1 - \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2} \sqrt{\frac{a + b + a \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2 - b \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2}{a + b}} +$$

$$30 a^4 B \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]\right], \frac{-a + b}{a + b}\right]$$

$$\sqrt{1 - \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2} \sqrt{\frac{a + b + a \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2 - b \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2}{a + b}} -$$

$$720 a^2 b^2 B \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]\right], \frac{-a + b}{a + b}\right]$$

$$\sqrt{1 - \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2} \sqrt{\frac{a + b + a \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2 - b \text{Tan}\left[\frac{1}{2} \left(c + d x\right)\right]^2}{a + b}} -$$

$$288\, b^4\, B\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right], \frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$240\, a^3\, A\, b\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right], \frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$960\, a\, A\, b^3\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right], \frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$30\, a^4\, B\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right], \frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$720\, a^2\, b^2\, B\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right], \frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$288\, b^4\, B\, \text{EllipticPi}\left[-1, -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right], \frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$(a+b)\,\left(264\, a^2\, A\, b+128\, A\, b^3+15\, a^3\, B+284\, a\, b^2\, B\right)$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right], \frac{-a+b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$2\, b\,\left(a^3\,(192\, A-59\, B)+4\, a\, b^2\,(76\, A-9\, B)+72\, b^3\, B+a^2\,(-104\, A\, b+322\, b\, B)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right], \frac{-a+b}{a+b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left.\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\right)$$

Problem 613: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\text{Cos}\left[c+d\,x\right]\right)^{5/2}\left(A+B\,\text{Cos}\left[c+d\,x\right]\right)}{\text{Sec}\left[c+d\,x\right]^{3/2}}\,dx$$

Optimal (type 4, 839 leaves, 11 steps):

$$-\left(\left(\left((a-b)\sqrt{a+b}\left(150 a^3 A b+2840 a A b^3-45 a^4 B+1692 a^2 b^2 B+1024 b^4 B\right)\right.\right.\right.$$

$$\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(1920\, a\, b^2\, d\sqrt{\text{Sec}[c+d x]}\right)\right)-$$

$$\left(\sqrt{a+b}\ \left(45 a^4 B-30 a^3 b\,(5 A+B)-16 b^4\,(45 A+64 B)-8 a b^3\left(355 A+193 B\right)-\right.\right.$$

$$\left.4 a^2 b^2\left(295 A+423 B\right)\right)\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(1920\, b^2\, d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(\sqrt{a+b}\ \left(10 a^4 A b-240 a^2 A b^3-96 A b^5-3 a^5 B-40 a^3 b^2 B-240 a b^4 B\right)\sqrt{\text{Cos}[c+d x]}\right.$$

$$\text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(128\, b^3\, d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(\left(50 a^2 A b+120 A b^3-15 a^3 B+172 a b^2 B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\ \text{Sin}[c+d x]\right)\Big/$$

$$\left(320\, b\, d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\frac{\left(50 a A b-15 a^2 B+64 b^2 B\right)\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}\text{Sin}[c+d x]}{240\, b\, d\sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{\left(10 A b-3 a B\right)\left(a+b\,\text{Cos}[c+d x]\right)^{5/2}\text{Sin}[c+d x]}{40\, b\, d\sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{B\left(a+b\,\text{Cos}[c+d x]\right)^{7/2}\text{Sin}[c+d x]}{5\, b\, d\sqrt{\text{Sec}[c+d x]}}+$$

$$\frac{1}{1920\, b^2\, d}$$

$$\left(150 a^3 A b+2840 a A b^3-45 a^4 B+1692 a^2 b^2 B+1024 b^4 B\right)$$

$$\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 4, 4552 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\,\Bigg(\frac{1}{960}\,(170\,a\,A\,b+93\,a^2\,B+88\,b^2\,B)\,\text{Sin}[c+d\,x]+$$

$$\frac{(590\,a^2\,A\,b+480\,A\,b^3+15\,a^3\,B+1024\,a\,b^2\,B)\,\text{Sin}[2\,(c+d\,x)]}{1920\,b}+\frac{1}{960}\,(170\,a\,A\,b+93\,a^2\,B+100\,b^2\,B)$$

$$\text{Sin}[3\,(c+d\,x)]+\frac{1}{320}\,b\,(10\,A\,b+21\,a\,B)\,\text{Sin}[4\,(c+d\,x)]+\frac{1}{80}\,b^2\,B\,\text{Sin}[5\,(c+d\,x)]\Bigg)+$$

$$\Bigg(\Bigg(\frac{161\,a^2\,A\,b}{96\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{3\,A\,b^3}{8\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{191\,a^3\,B}{320\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{289\,a\,b^2\,B}{240\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+$$

$$\frac{133\,a^3\,A\,\sqrt{\text{Sec}[c+d\,x]}}{384\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{89\,a\,A\,b^2\,\sqrt{\text{Sec}[c+d\,x]}}{96\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{a^4\,B\,\sqrt{\text{Sec}[c+d\,x]}}{256\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{809\,a^2\,b\,B\,\sqrt{\text{Sec}[c+d\,x]}}{960\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{4\,b^3\,B\,\sqrt{\text{Sec}[c+d\,x]}}{15\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{5\,a^3\,A\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{128\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{71\,a\,A\,b^2\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{96\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}-\frac{3\,a^4\,B\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{256\,b\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+$$

$$\frac{141\,a^2\,b\,B\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{320\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}+\frac{4\,b^3\,B\,\text{Cos}[2\,(c+d\,x)]\,\sqrt{\text{Sec}[c+d\,x]}}{15\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}\Bigg)$$

$$\Bigg(\Bigg((150\,a^3\,A\,b+2840\,a\,A\,b^3-45\,a^4\,B+1692\,a^2\,b^2\,B+1024\,b^4\,B)\,\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2-b\,\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{1+\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}}\Bigg)\Bigg/\Bigg(1920\,b^2\,\sqrt{\frac{1+\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}{1-\text{Tan}\big[\frac{1}{2}\,(c+d\,x)\big]^2}}\Bigg)+$$

$$\Bigg(\Bigg((a+b)\,(-150\,a^3\,A\,b-2840\,a\,A\,b^3+45\,a^4\,B-1692\,a^2\,b^2\,B-1024\,b^4\,B)$$

$$\text{EllipticE}\Big[\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]+2\,b\,(720\,A\,b^4-8\,a\,b^3\,(45\,A-289\,B)+$$

$$4\,a^2\,b^2\,(805\,A-193\,B)-15\,a^4\,B+a^3\,(-590\,A\,b+1146\,b\,B))\,\text{EllipticF}\Big[$$

$$\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]+30\,(-10\,a^4\,A\,b+240\,a^2\,A\,b^3+96\,A\,b^5+3\,a^5\,B+$$

$$40\,a^3\,b^2\,B+240\,a\,b^4\,B)\,\text{EllipticPi}\Big[-1,-\text{ArcSin}\Big[\text{Tan}\Big[\frac{1}{2}\,(c+d\,x)\Big]\Big],\frac{-a+b}{a+b}\Big]\Bigg)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\ \sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\Bigg)\Bigg/$$

$$\Bigg(1920\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg(d\,\Bigg(\Bigg(\left(150\,a^3\,A\,b+2840\,a\,A\,b^3-45\,a^4\,B+1692\,a^2\,b^2\,B+1024\,b^4\,B\right)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\Bigg)\Bigg/\left(3840\,b^2\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right)-$$

$$\Bigg(\Bigg((a+b)\,\left(-150\,a^3\,A\,b-2840\,a\,A\,b^3+45\,a^4\,B-1692\,a^2\,b^2\,B-1024\,b^4\,B\right)$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$2\,b\,\big(720\,A\,b^4-8\,a\,b^3\,(45\,A-289\,B)+4\,a^2\,b^2\,(805\,A-193\,B)-15\,a^4\,B+$$

$$a^3\,(-590\,A\,b+1146\,b\,B)\big)\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]+$$

$$30\,\left(-10\,a^4\,A\,b+240\,a^2\,A\,b^3+96\,A\,b^5+3\,a^5\,B+40\,a^3\,b^2\,B+240\,a\,b^4\,B\right)$$

$$\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\Bigg)\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\Bigg)\Bigg/$$

$$\Bigg(1920\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\ \sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4}\Bigg)-$$

$$\left(\left((a+b)\left(-150 a^3 A b-2840 a A b^3+45 a^4 B-1692 a^2 b^2 B-1024 b^4 B\right)\right.\right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]+$$
$$2 b\left(720 A b^4-8 a b^3(45 A-289 B)+4 a^2 b^2(805 A-193 B)-15 a^4 B+\right.$$
$$\left.a^3(-590 A b+1146 b B)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]+$$
$$30\left(-10 a^4 A b+240 a^2 A b^3+96 A b^5+3 a^5 B+40 a^3 b^2 B+240 a b^4 B\right)$$
$$\left.\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]\right)$$
$$\left(a \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]-b \,\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)$$
$$\left.\sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\right)\Big/$$

$$\left(3840 b^2(a+b)^2\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right.$$
$$\left.\left(\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}\right)^{3/2}\right)-$$

$$\left(\left((a+b)\left(-150 a^3 A b-2840 a A b^3+45 a^4 B-1692 a^2 b^2 B-1024 b^4 B\right)\right.\right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]+$$
$$2 b\left(720 A b^4-8 a b^3(45 A-289 B)+4 a^2 b^2(805 A-193 B)-15 a^4 B+\right.$$
$$\left.a^3(-590 A b+1146 b B)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\right]+$$
$$30\left(-10 a^4 A b+240 a^2 A b^3+96 A b^5+3 a^5 B+40 a^3 b^2 B+240 a b^4 B\right)\text{EllipticPi}\Big[$$
$$\left.-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\frac{-a+b}{a+b}\Big]\right)\text{Sec}\left[\frac{1}{2}(c+d x)\right]^2 \text{Tan}\left[\frac{1}{2}(c+d x)\right]$$
$$\left.\sqrt{\frac{a+b+a \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^4}\right)\Big/$$

$$\left(1920 b^2(a+b)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2\right.$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)-$$

$$\Bigg(\Bigg((a+b)\left(-150\,a^3\,A\,b-2840\,a\,A\,b^3+45\,a^4\,B-1692\,a^2\,b^2\,B-1024\,b^4\,B\right)$$

$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$2\,b\left(720\,A\,b^4-8\,a\,b^3\,(45\,A-289\,B)+4\,a^2\,b^2\,(805\,A-193\,B)-15\,a^4\,B+\right.$$

$$\left.a^3\,(-590\,A\,b+1146\,b\,B)\right)\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$30\left(-10\,a^4\,A\,b+240\,a^2\,A\,b^3+96\,A\,b^5+3\,a^5\,B+40\,a^3\,b^2\,B+240\,a\,b^4\,B\right)$$

$$\left.\mathrm{EllipticPi}\left[-1,-\mathrm{ArcSin}\left[\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\right)$$

$$\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}$$

$$\left.\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^4}\right)\Bigg/\Bigg(3840\,b^2$$

$$\left.(a+b)\left(-1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{a+b}}\right)-$$

$$\Bigg(\left(150\,a^3\,A\,b+2840\,a\,A\,b^3-45\,a^4\,B+1692\,a^2\,b^2\,B+1024\,b^4\,B\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\left(\frac{\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}+\right.$$

$$\left(\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)\right)\Bigg/$$

$$\left.\left.\left(1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2\right)\right)\Bigg/\left(3840\,b^2\left(\frac{1+\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1-\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\right)^{3/2}\right)+$$

$$\Bigg(\left(150\,a^3\,A\,b+2840\,a\,A\,b^3-45\,a^4\,B+1692\,a^2\,b^2\,B+1024\,b^4\,B\right)\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]$$

$$\left(\left(a\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]-b\,\mathrm{Sec}\left[\frac{1}{2}(c+d\,x)\right]^2\,\mathrm{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)\Bigg/\right.$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)-\left(\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right.$$

$$\left.\left.\left(a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)\Big/\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2\right)\right)\Big/$$

$$\left(3840\,b^2\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\right)+$$

$$\left(\left((a+b)\left(-150\,a^3\,A\,b-2840\,a\,A\,b^3+45\,a^4\,B-1692\,a^2\,b^2\,B-1024\,b^4\,B\right)\right.\right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$2\,b\left(720\,A\,b^4-8\,a\,b^3(45\,A-289\,B)+4\,a^2\,b^2(805\,A-193\,B)-15\,a^4\,B+\right.$$

$$\left.a^3(-590\,A\,b+1146\,b\,B)\right)\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{-a+b}{a+b}\right]+$$

$$30\left(-10\,a^4\,A\,b+240\,a^2\,A\,b^3+96\,A\,b^5+3\,a^5\,B+40\,a^3\,b^2\,B+240\,a\,b^4\,B\right)$$

$$\left.\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\frac{-a+b}{a+b}\right]\right)\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^4}$$

$$\left(\left(a\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\text{Tan}\left[\frac{1}{2}(c+dx)\right]-b\,\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right)\Big/\right.$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)-\left(\text{Sec}\left[\frac{1}{2}(c+dx)\right]^2\text{Tan}\left[\frac{1}{2}(c+dx)\right]\right.$$

$$\left.\left.\left.\left(a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right)\Big/\left(1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^2\right)\right)\Big/$$

$$\left(3840\,b^2(a+b)\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\left(-1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\right.$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}$$

$$\left.\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\right)+$$

$$\left(\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+dx)\right]^4}\right.$$

$$\left(\left(b\left(720\,A\,b^4-8\,a\,b^3\,(45\,A-289\,B)+4\,a^2\,b^2\,(805\,A-193\,B)-15\,a^4\,B+a^3\,(-590\,A\,b+1146\,b\,B)\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)-\left(15\,\left(-10\,a^4\,A\,b+240\,a^2\,A\,b^3+96\,A\,b^5+3\,a^5\,B+40\,a^3\,b^2\,B+240\,a\,b^4\,B\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\Big/\left(\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)+\left((a+b)\,\left(-150\,a^3\,A\,b-2840\,a\,A\,b^3+45\,a^4\,B-1692\,a^2\,b^2\,B-1024\,b^4\,B\right)\,\mathrm{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^2\,\sqrt{1-\frac{(-a+b)\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\Big/\left(2\,\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\right)\right)\Big/\left(1920\,b^2\,(a+b)\,\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\left(-1+\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)$$

Problem 614: Unable to integrate problem.

$$\int \frac{(A+B\,\mathrm{Cos}[c+d\,x])\,\mathrm{Sec}[c+d\,x]^{7/2}}{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 403 leaves, 6 steps):

$$\left(2\,(a-b)\,\sqrt{a+b}\,\left(9\,a^2\,A+8\,A\,b^2-10\,a\,b\,B\right)\,\sqrt{\text{Cos}[c+d\,x]}\right.$$

$$\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(15\,a^4\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\,\sqrt{a+b}\,\left(8\,A\,b^2+a^2\,(9\,A-5\,B)-2\,a\,b\,(A+5\,B)\right)\,\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Bigg/\left(15\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\frac{2\,(4\,A\,b-5\,a\,B)\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{15\,a^2\,d}+$$

$$\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\text{Sec}[c+d\,x]^{5/2}\,\text{Sin}[c+d\,x]}{5\,a\,d}$$

Result (type 8, 37 leaves):

$$\int\frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{7/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Problem 615: Unable to integrate problem.

$$\int\frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{5/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 330 leaves, 5 steps):

$$-\left(\left(2\,(a-b)\,\sqrt{a+b}\,(2\,A\,b-3\,a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^3\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$

$$\left(2\,\sqrt{a+b}\,(2\,A\,b+a\,(A-3\,B))\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(3\,a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{2\,A\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\text{Sec}[c+d\,x]^{3/2}\,\text{Sin}[c+d\,x]}{3\,a\,d}$$

Result (type 8, 37 leaves):

$$\int\frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{5/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Problem 616: Unable to integrate problem.

$$\int\frac{(A+B\,\text{Cos}[c+d\,x])\,\text{Sec}[c+d\,x]^{3/2}}{\sqrt{a+b\,\text{Cos}[c+d\,x]}}\,dx$$

Optimal (type 4, 270 leaves, 4 steps):

$$\left(2\,A\,(a-b)\,\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(a^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\,\sqrt{a+b}\,(A-B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(a\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)$$

Result (type 8, 37 leaves):

$$\int \frac{(A + B\,\text{Cos}[c + d\,x])\,\text{Sec}[c + d\,x]^{3/2}}{\sqrt{a + b\,\text{Cos}[c + d\,x]}}\,dx$$

Problem 618: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{A + B\,\text{Cos}[c + d\,x]}{\sqrt{a + b\,\text{Cos}[c + d\,x]}\,\sqrt{\text{Sec}[c + d\,x]}}\,dx$$

Optimal (type 4, 487 leaves, 8 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,B\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(a\,b\,d\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$

$$\left(\sqrt{a+b}\,B\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(b\,d\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(\sqrt{a+b}\,(2\,A\,b-a\,B)\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(b^2\,d\sqrt{\text{Sec}[c+d\,x]}\right)+\frac{B\,\text{Sin}[c+d\,x]}{d\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a\,B\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,d\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1091 leaves):

$$\left(\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(a\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,b\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-\right.$$

$$a\sqrt{\frac{a-b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+b\sqrt{\frac{a-b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$4\,\mathrm{i}\,A\,b\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,\mathrm{i}\,a\,B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;-$$

$$4\,\mathrm{i}\,A\,b\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$2\,\mathrm{i}\,a\,B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\;\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+$$

$$\mathrm{i}\,(a-b)\,B\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\;+2\,\mathrm{i}\,(A\,b-a\,B)$$

$$\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(b\sqrt{\frac{a-b}{a+b}}\, d\left(-1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\right.$$

$$\left.\left(b\left(-1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\right)\right)$$

Problem 619: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}\left[c+d\,x\right]}{\sqrt{a+b\,\text{Cos}\left[c+d\,x\right]}\;\text{Sec}\left[c+d\,x\right]^{3/2}}\,dx$$

Optimal (type 4, 539 leaves, 8 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,(4 A b-3 a B)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\bigg/\left(4 a b^2 d\sqrt{\text{Sec}[c+d x]}\right)\right)+$$

$$\left(\sqrt{a+b}\,(4 A b-3 a B+2 b B)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\bigg/\left(4 b^2 d\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(\sqrt{a+b}\,(4 a A b-3 a^2 B-4 b^2 B)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\bigg/$$

$$\left(4 b^3 d\sqrt{\text{Sec}[c+d x]}\right)+\frac{B\sqrt{a+b\,\text{Cos}[c+d x]}\,\text{Sin}[c+d x]}{2 b d\sqrt{\text{Sec}[c+d x]}}+\frac{(4 A b-3 a B)\sqrt{a+b\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{4 b^2 d}$$

Result (type 4, 1169 leaves):

$$\frac{B\sqrt{a+b\,\text{Cos}[c+d x]}\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[2\,(c+d x)]}{4 b d}+$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$

$$\left(-4 a A b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]-4 A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+3 a^2 B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+\right.$$

$$3 a b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]+8 A b^2\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3-6 a b B\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^3+$$

$$4\,a\,A\,b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-4\,A\,b^2\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-3\,a^2\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+$$

$$3\,a\,b\,B\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-8\,a\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$6\,a^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$8\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$8\,a\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$6\,a^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$8\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+(a+b)$$

$$(-4\,A\,b+3\,a\,B)\,\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$2\,(a-2\,b)\,b\,B\,\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}\Bigg)\Bigg)\Bigg/$$

$$\left(4\,b^2\,d\,\sqrt{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\left(b\left(-1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\right)\right)$$

Problem 620: Attempted integration timed out after 120 seconds.

$$\int\frac{\left(A+B\,\text{Cos}\left[c+d\,x\right]\right)\,\text{Sec}\left[c+d\,x\right]^{5/2}}{\left(a+b\,\text{Cos}\left[c+d\,x\right]\right)^{3/2}}\,dx$$

Optimal (type 4, 433 leaves, 6 steps):

$$-\left(\left(\left(2\left(5\,a^2\,A\,b-8\,A\,b^3-3\,a^3\,B+6\,a\,b^2\,B\right)\sqrt{\text{Cos}\left[c+d\,x\right]}\right.\right.\right.$$

$$\text{Csc}\left[c+d\,x\right]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}\left[c+d\,x\right]}}{\sqrt{a+b}\,\sqrt{\text{Cos}\left[c+d\,x\right]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a\left(1-\text{Sec}\left[c+d\,x\right]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}\left[c+d\,x\right]\right)}{a-b}}\right)\Bigg/\left(3\,a^4\,\sqrt{a+b}\,d\,\sqrt{\text{Sec}\left[c+d\,x\right]}\right)\Bigg)+$$

$$\left(2\left(a+2\,b\right)\left(4\,A\,b+a\left(A-3\,B\right)\right)\sqrt{\text{Cos}\left[c+d\,x\right]}\,\text{Csc}\left[c+d\,x\right]\,\text{EllipticF}\left[\right.\right.$$

$$\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}\left[c+d\,x\right]}}{\sqrt{a+b}\,\sqrt{\text{Cos}\left[c+d\,x\right]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}\left[c+d\,x\right]\right)}{a+b}}\,\sqrt{\frac{a\left(1+\text{Sec}\left[c+d\,x\right]\right)}{a-b}}\Bigg)\Bigg/$$

$$\left(3\,a^3\,\sqrt{a+b}\,d\,\sqrt{\text{Sec}\left[c+d\,x\right]}\right)+\frac{2\,b\left(A\,b-a\,B\right)\,\text{Sec}\left[c+d\,x\right]^{3/2}\,\text{Sin}\left[c+d\,x\right]}{a\left(a^2-b^2\right)\,d\,\sqrt{a+b\,\text{Cos}\left[c+d\,x\right]}}+$$

$$\frac{1}{3\,a^2\left(a^2-b^2\right)\,d}2\left(a^2\,A-4\,A\,b^2+3\,a\,b\,B\right)\sqrt{a+b\,\text{Cos}\left[c+d\,x\right]}$$

$$\text{Sec}\left[c+d\,x\right]^{3/2}\,\text{Sin}\left[c+d\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 621: Unable to integrate problem.

$$\int\frac{\left(A+B\,\text{Cos}\left[c+d\,x\right]\right)\,\text{Sec}\left[c+d\,x\right]^{3/2}}{\left(a+b\,\text{Cos}\left[c+d\,x\right]\right)^{3/2}}\,dx$$

Optimal (type 4, 345 leaves, 5 steps):

$$\left(2\left(a^2 A-2 A b^2+a b B\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],\right.\right.$$
$$\left.\left.-\frac{a+b}{a-b}\right] \sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(a^3 \sqrt{a+b}\ d \sqrt{\text{Sec}[c+d x]}\right)-$$
$$\left(2\,(2 A b+a\,(A-B)) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],\right.\right.$$
$$\left.\left.-\frac{a+b}{a-b}\right] \sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/$$
$$\left(a^2 \sqrt{a+b}\ d \sqrt{\text{Sec}[c+d x]}\right)+\frac{2 b\,(A b-a B) \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{a\left(a^2-b^2\right) d \sqrt{a+b\,\text{Cos}[c+d x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{(A+B\,\text{Cos}[c+d x])\ \text{Sec}[c+d x]^{3/2}}{(a+b\,\text{Cos}[c+d x])^{3/2}}\, dx$$

Problem 622: Unable to integrate problem.

$$\int \frac{(A+B\,\text{Cos}[c+d x]) \sqrt{\text{Sec}[c+d x]}}{(a+b\,\text{Cos}[c+d x])^{3/2}}\, dx$$

Optimal (type 4, 324 leaves, 5 steps):

$$\left(2\,(A\,b-a\,B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\right.$$

$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(a^2\,\sqrt{a+b}\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)+$$

$$\left(2\,(A+B)\,\sqrt{\mathrm{Cos}[c+d\,x]}\,\mathrm{Csc}[c+d\,x]\,\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\mathrm{Cos}[c+d\,x]}}\right],\,-\frac{a+b}{a-b}\right]\right.$$

$$\left.\sqrt{\frac{a\,(1-\mathrm{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(a\,\sqrt{a+b}\,d\,\sqrt{\mathrm{Sec}[c+d\,x]}\right)-\frac{2\,(A\,b-a\,B)\,\sqrt{\mathrm{Sec}[c+d\,x]}\,\mathrm{Sin}[c+d\,x]}{(a^2-b^2)\,d\,\sqrt{a+b\,\mathrm{Cos}[c+d\,x]}}$$

Result (type 8, 37 leaves):

$$\int\frac{(A+B\,\mathrm{Cos}[c+d\,x])\,\sqrt{\mathrm{Sec}[c+d\,x]}}{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}}\,dx$$

Problem 623: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\mathrm{Cos}[c+d\,x]}{(a+b\,\mathrm{Cos}[c+d\,x])^{3/2}\,\sqrt{\mathrm{Sec}[c+d\,x]}}\,dx$$

Optimal (type 4, 476 leaves, 7 steps):

$$-\left(\left(2\,(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\right.\right.$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(a\,b\,\sqrt{a+b}\;d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(2\,(A\,b-a\,B)\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\right.$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/\left(a\,b\,\sqrt{a+b}\;d\,\sqrt{\text{Sec}[c+d\,x]}\right)-$$

$$\left(2\,\sqrt{a+b}\;B\,\sqrt{\text{Cos}[c+d\,x]}\;\text{Csc}[c+d\,x]\;\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\;\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\;\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\Big/$$

$$\left(b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+\frac{2\,a\,(A\,b-a\,B)\,\sqrt{\text{Sec}[c+d\,x]}\;\text{Sin}[c+d\,x]}{b\,(a^2-b^2)\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 1403 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\;\sqrt{\text{Sec}[c+d\,x]}$$

$$\left(\frac{2\,(A\,b-a\,B)\,\text{Sin}[c+d\,x]}{b\,(-a^2+b^2)}-\frac{2\,(a\,A\,b\,\text{Sin}[c+d\,x]-a^2\,B\,\text{Sin}[c+d\,x])}{b\,(-a^2+b^2)\,(a+b\,\text{Cos}[c+d\,x])}\right)+$$

$$\left(2\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}}\right.$$

$$\left(a\,A\,b\,\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+A\,b^2\,\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a^2\,\sqrt{\frac{a-b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$a\,b\,\sqrt{\frac{a-b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-2\,A\,b^2\,\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+$$

$$2\,a\,b\,\sqrt{\frac{a-b}{a+b}}\;B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-a\,A\,b\,\sqrt{\frac{a-b}{a+b}}\;\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+A\,b^2\,\sqrt{\frac{a-b}{a+b}}$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^5+a^2\sqrt{\frac{a-b}{a+b}}\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^5-a\,b\sqrt{\frac{a-b}{a+b}}\,B\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^5-$$

$$2\,\mathrm{i}\,a^2\,B\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2\,\mathrm{i}\,b^2\,B\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$2\,\mathrm{i}\,a^2\,B\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],-\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2\,\mathrm{i}\,b^2\,B\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],-\frac{a+b}{a-b}\right]\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}-$$

$$\mathrm{i}\,(a-b)\,(-A\,b+a\,B)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\,\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+\mathrm{i}\,(a-b)\,(-A\,b+(2\,a+b)\,B)$$

$$\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]\right],-\frac{a+b}{a-b}\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\Bigg)\Bigg)\Big/$$
$$\left(b\sqrt{\frac{a-b}{a+b}}\left(a^2-b^2\right)d\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}}\right.$$
$$\left.\left(b\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 624: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+d x]}{(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sec}[c+d x]^{3/2}}\,dx$$

Optimal (type 4, 560 leaves, 8 steps):

$$\left(\left(2 a A b-3 a^2 B+b^2 B\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],\right.\right.$$
$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(a b^2\sqrt{a+b}\,d\sqrt{\text{Sec}[c+d x]}\right)-$$
$$\left(\left(2 A b-(3 a+b) B\right)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],\right.\right.$$
$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/\left(b^2\sqrt{a+b}\,d\sqrt{\text{Sec}[c+d x]}\right)-$$
$$\left(\sqrt{a+b}\,(2 A b-3 a B)\sqrt{\text{Cos}[c+d x]}\,\text{Csc}[c+d x]\,\text{EllipticPi}\left[\frac{a+b}{b},\right.\right.$$
$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right)\Big/$$
$$\left(b^3 d\sqrt{\text{Sec}[c+d x]}\right)+\frac{2 a\,(A b-a B)\,\text{Sin}[c+d x]}{b\left(a^2-b^2\right)d\sqrt{a+b\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}}-$$
$$\frac{\left(2 a A b-3 a^2 B+b^2 B\right)\sqrt{a+b\,\text{Cos}[c+d x]}\,\sqrt{\text{Sec}[c+d x]}\,\text{Sin}[c+d x]}{b^2\left(a^2-b^2\right)d}$$

Result (type 4, 1567 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}\left(-\frac{2\,a\,(-A\,b+a\,B)\,\text{Sin}[c+d\,x]}{b^2\,(a^2-b^2)}+\frac{2\,(a^2\,A\,b\,\text{Sin}[c+d\,x]-a^3\,B\,\text{Sin}[c+d\,x])}{b^2\,(-a^2+b^2)\,(a+b\,\text{Cos}[c+d\,x])}\right)-$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}[\frac{1}{2}(c+d\,x)]^2}}\,\sqrt{\frac{a+b+a\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2-b\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2}{1+\text{Tan}[\frac{1}{2}(c+d\,x)]^2}}\right.$$

$$\left(2\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+2\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-3\,a^3\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-\right.$$

$$3\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]+b^3\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-$$

$$4\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3+6\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-2\,b^3\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^3-$$

$$2\,a^2\,A\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+2\,a\,A\,b^2\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+3\,a^3\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-$$

$$3\,a^2\,b\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5-a\,b^2\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+b^3\,B\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^5+$$

$$4\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2-b\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2}{a+b}}-$$

$$4\,A\,b^3\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2-b\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2}{a+b}}-$$

$$6\,a^3\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2-b\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2}{a+b}}+$$

$$6\,a\,b^2\,B\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2-b\,\text{Tan}[\frac{1}{2}(c+d\,x)]^2}{a+b}}+$$

$$4\,a^2\,A\,b\,\text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ -$$

$$4\,A\,b^3\,\text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ -$$

$$6\,a^3\,B\,\text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +$$

$$6\,a\,b^2\,B\,\text{EllipticPi}\left[-1,\ -\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{-a+b}{a+b}\right]\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ -$$

$$(a+b)\left(-2\,a\,A\,b+3\,a^2\,B-b^2\,B\right)\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\ +2\,b\,(a+b)\,(-A\,b+a\,B)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right],\ \frac{-a+b}{a+b}\right]\sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right)\Bigg/$$

$$\left(b^2\left(-a^2+b^2\right)d\,\sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}\ \left(b\left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 625: Attempted integration timed out after 120 seconds.

$$\int \frac{(A+B\,\text{Cos}[c+d x])\,\text{Sec}[c+d x]^{5/2}}{(a+b\,\text{Cos}[c+d x])^{5/2}}\,dx$$

Optimal (type 4, 607 leaves, 7 steps):

$$-\left(\left(2\left(8 a^4 A b-28 a^2 A b^3+16 A b^5-3 a^5 B+15 a^3 b^2 B-8 a b^4 B\right) \sqrt{\operatorname{Cos}[c+d x]} \operatorname{Csc}[c+d x]\right.\right.$$

$$\text{EllipticE}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a^5(a-b)(a+b)^{3/2} d \sqrt{\operatorname{Sec}[c+d x]}\right)\Bigg)-$$

$$\left(2\left(16 A b^4-a^4(A-3 B)+4 a b^3(3 A-2 B)-9 a^3 b(A-B)-2 a^2 b^2(8 A+3 B)\right)\right.$$

$$\sqrt{\operatorname{Cos}[c+d x]} \operatorname{Csc}[c+d x] \text{EllipticF}\left[\operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]$$

$$\left.\sqrt{\frac{a(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/$$

$$\left(3 a^4 \sqrt{a+b}\left(a^2-b^2\right) d \sqrt{\operatorname{Sec}[c+d x]}\right)+\frac{2 b(A b-a B) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{3 a\left(a^2-b^2\right) d(a+b \operatorname{Cos}[c+d x])^{3/2}}+$$

$$\frac{2 b\left(10 a^2 A b-6 A b^3-7 a^3 B+3 a b^2 B\right) \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]}{3 a^2\left(a^2-b^2\right)^2 d \sqrt{a+b \operatorname{Cos}[c+d x]}}+$$

$$\frac{1}{3 a^3\left(a^2-b^2\right)^2 d}$$

$$2\left(a^4 A-13 a^2 A b^2+8 A b^4+8 a^3 b B-4 a b^3 B\right)$$

$$\sqrt{a+b \operatorname{Cos}[c+d x]} \operatorname{Sec}[c+d x]^{3/2} \operatorname{Sin}[c+d x]$$

Result (type 1, 1 leaves):

???

Problem 626: Attempted integration timed out after 120 seconds.

$$\int \frac{(A+B \operatorname{Cos}[c+d x]) \operatorname{Sec}[c+d x]^{3/2}}{(a+b \operatorname{Cos}[c+d x])^{5/2}} \, dx$$

Optimal (type 4, 496 leaves, 6 steps):

$$\left(2 \left(3 a^4 A - 15 a^2 A b^2 + 8 A b^4 + 6 a^3 b B - 2 a b^3 B\right) \sqrt{\text{Cos}[c + d x]} \ \text{Csc}[c + d x] \right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a + b \,\text{Cos}[c + d x]}}{\sqrt{a + b} \ \sqrt{\text{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a \left(1 - \text{Sec}[c + d x]\right)}{a + b}}$$

$$\left.\sqrt{\frac{a \left(1 + \text{Sec}[c + d x]\right)}{a - b}}\right) \Big/ \left(3 a^4 \left(a - b\right) \left(a + b\right)^{3/2} d \sqrt{\text{Sec}[c + d x]}\right) +$$

$$\left(2 \left(8 A b^3 - 3 a^3 (A - B) + 2 a b^2 \left(3 A - B\right) - 3 a^2 b \left(3 A + B\right)\right) \sqrt{\text{Cos}[c + d x]} \ \text{Csc}[c + d x] \ \text{EllipticF}\left[\right.\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a + b \,\text{Cos}[c + d x]}}{\sqrt{a + b} \ \sqrt{\text{Cos}[c + d x]}}\right], -\frac{a + b}{a - b}\right] \sqrt{\frac{a \left(1 - \text{Sec}[c + d x]\right)}{a + b}} \ \sqrt{\frac{a \left(1 + \text{Sec}[c + d x]\right)}{a - b}}\right) \Big/$$

$$\left(3 a^3 \sqrt{a + b} \ \left(a^2 - b^2\right) d \sqrt{\text{Sec}[c + d x]}\right) + \frac{2 b \left(A b - a B\right) \sqrt{\text{Sec}[c + d x]} \ \text{Sin}[c + d x]}{3 a \left(a^2 - b^2\right) d \left(a + b \,\text{Cos}[c + d x]\right)^{3/2}} +$$

$$\frac{2 b \left(8 a^2 A b - 4 A b^3 - 5 a^3 B + a b^2 B\right) \sqrt{\text{Sec}[c + d x]} \ \text{Sin}[c + d x]}{3 a^2 \left(a^2 - b^2\right)^2 d \sqrt{a + b \,\text{Cos}[c + d x]}}$$

Result (type 1, 1 leaves):

???

Problem 627: Unable to integrate problem.

$$\int \frac{\left(A + B \,\text{Cos}[c + d x]\right) \sqrt{\text{Sec}[c + d x]}}{\left(a + b \,\text{Cos}[c + d x]\right)^{5/2}} \, dx$$

Optimal (type 4, 469 leaves, 6 steps):

$$\left(2\left(6a^2 A b - 2 A b^3 - 3 a^3 B - a b^2 B\right)\sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{Csc}[c+d x]\right.$$

$$\mathrm{EllipticE}\left[\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\mathrm{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\mathrm{Sec}[c+d x]\right)}{a+b}}$$

$$\left.\sqrt{\frac{a\left(1+\mathrm{Sec}[c+d x]\right)}{a-b}}\right) \Big/ \left(3 a^3 (a-b)\ (a+b)^{3/2} d \sqrt{\mathrm{Sec}[c+d x]}\right) -$$

$$\left(2\left(2 A b^2 - 3 a^2 (A+B) + a b (3 A + B)\right)\sqrt{\mathrm{Cos}[c+d x]}\ \mathrm{Csc}[c+d x]\ \mathrm{EllipticF}\left[\right.\right.$$

$$\left.\left.\mathrm{ArcSin}\left[\frac{\sqrt{a+b\,\mathrm{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\mathrm{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\mathrm{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\mathrm{Sec}[c+d x]\right)}{a-b}}\right) \Big/$$

$$\left(3 a^2 \sqrt{a+b}\ \left(a^2-b^2\right) d \sqrt{\mathrm{Sec}[c+d x]}\right) + \frac{2 b (A b - a B)\ \mathrm{Sin}[c+d x]}{3 a \left(a^2-b^2\right) d \left(a+b\,\mathrm{Cos}[c+d x]\right)^{3/2} \sqrt{\mathrm{Sec}[c+d x]}} -$$

$$\frac{2\left(6 a^2 A b - 2 A b^3 - 3 a^3 B - a b^2 B\right)\sqrt{\mathrm{Sec}[c+d x]}\ \mathrm{Sin}[c+d x]}{3 a \left(a^2-b^2\right)^2 d \sqrt{a+b\,\mathrm{Cos}[c+d x]}}$$

Result (type 8, 37 leaves):

$$\int \frac{\left(A+B\,\mathrm{Cos}[c+d x]\right)\sqrt{\mathrm{Sec}[c+d x]}}{\left(a+b\,\mathrm{Cos}[c+d x]\right)^{5/2}}\, dx$$

Problem 628: Unable to integrate problem.

$$\int \frac{A+B\,\mathrm{Cos}[c+d x]}{\left(a+b\,\mathrm{Cos}[c+d x]\right)^{5/2}\sqrt{\mathrm{Sec}[c+d x]}}\, dx$$

Optimal (type 4, 431 leaves, 6 steps):

$$-\left(\left(2\left(3a^2A+Ab^2-4abB\right)\sqrt{\text{Cos}[c+dx]}\,\text{Csc}[c+dx]\right.\right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+dx])}{a+b}}$$

$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+dx])}{a-b}}\right)\Bigg/\left(3a^2\,(a-b)\,(a+b)^{3/2}\,d\,\sqrt{\text{Sec}[c+dx]}\right)\Bigg)+$$

$$\Bigg(2\left(a\,(3A+B)-b\,(A+3B)\right)\sqrt{\text{Cos}[c+dx]}\,\text{Csc}[c+dx]\,\text{EllipticF}\Big[$$

$$\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+dx]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+dx]}}\right],-\frac{a+b}{a-b}\Big]\sqrt{\frac{a\,(1-\text{Sec}[c+dx])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+dx])}{a-b}}\Bigg)\Bigg/$$

$$\left(3a\,(a-b)\,(a+b)^{3/2}\,d\,\sqrt{\text{Sec}[c+dx]}\right)-\frac{2\,(Ab-aB)\,\text{Sin}[c+dx]}{3\left(a^2-b^2\right)d\,(a+b\,\text{Cos}[c+dx])^{3/2}\sqrt{\text{Sec}[c+dx]}}+$$

$$\frac{2\left(3a^2A+Ab^2-4abB\right)\sqrt{\text{Sec}[c+dx]}\,\text{Sin}[c+dx]}{3\left(a^2-b^2\right)^2d\,\sqrt{a+b\,\text{Cos}[c+dx]}}$$

Result (type 8, 37 leaves):

$$\int\frac{A+B\,\text{Cos}[c+dx]}{(a+b\,\text{Cos}[c+dx])^{5/2}\sqrt{\text{Sec}[c+dx]}}\,dx$$

Problem 629: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}[c+dx]}{(a+b\,\text{Cos}[c+dx])^{5/2}\,\text{Sec}[c+dx]^{3/2}}\,dx$$

Optimal (type 4, 602 leaves, 8 steps):

$$\left(2\left(4 A b^3+3 a^3 B-7 a b^2 B\right)\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(3 a\left(a-b\right) b^2\left(a+b\right)^{3/2} d\sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(2\left(3 A b^3+3 a^3 B+a^2 b B-a b^2\left(A+6 B\right)\right)\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(3 a\left(a-b\right) b^2\left(a+b\right)^{3/2} d\sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(2\sqrt{a+b}\ B\sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right]\sqrt{\frac{a\left(1-\text{Sec}[c+d x]\right)}{a+b}}\ \sqrt{\frac{a\left(1+\text{Sec}[c+d x]\right)}{a-b}}\right)\Big/\left(b^3 d\sqrt{\text{Sec}[c+d x]}\right)+\frac{2 a\left(A b-a B\right)\text{Sin}[c+d x]}{3 b\left(a^2-b^2\right) d\left(a+b\,\text{Cos}[c+d x]\right)^{3/2}\sqrt{\text{Sec}[c+d x]}}-$$

$$\frac{2 a\left(4 A b^3+3 a^3 B-7 a b^2 B\right)\sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]}{3 b^2\left(a^2-b^2\right)^2 d\sqrt{a+b\,\text{Cos}[c+d x]}}$$

Result (type 4, 1994 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\left(\frac{2\left(4 A b^3+3 a^3 B-7 a b^2 B\right)\text{Sin}[c+d x]}{3 b^2\left(-a^2+b^2\right)^2}-\frac{2\left(-a^2 A b\,\text{Sin}[c+d x]+a^3 B\,\text{Sin}[c+d x]\right)}{3 b^2\left(-a^2+b^2\right)\left(a+b\,\text{Cos}[c+d x]\right)^2}-\left(2\left(-a^3 A b\,\text{Sin}[c+d x]+5 a A b^3\,\text{Sin}[c+d x]+4 a^4 B\,\text{Sin}[c+d x]-8 a^2 b^2 B\,\text{Sin}[c+d x]\right)\right)\Big/\left(3 b^2\left(-a^2+b^2\right)^2\left(a+b\,\text{Cos}[c+d x]\right)\right)\right)-$$

$$\left(2\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}}\right.$$

$$\left(4\,a\,A\,b^3\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+4\,A\,b^4\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+\right.$$

$$3\,a^4\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]+3\,a^3\,b\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-7\,a^2\,b^2\sqrt{\frac{a-b}{a+b}}\,B$$

$$\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-7\,a\,b^3\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]-8\,A\,b^4\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-$$

$$6\,a^3\,b\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3+14\,a\,b^3\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^3-$$

$$4\,a\,A\,b^3\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+4\,A\,b^4\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-$$

$$3\,a^4\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+3\,a^3\,b\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+$$

$$7\,a^2\,b^2\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5-7\,a\,b^3\sqrt{\frac{a-b}{a+b}}\,B\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^5+$$

$$6\,\text{i}\,a^4\,B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}-$$

$$12\,\text{i}\,a^2\,b^2\,B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2}{a+b}}+$$

$$6\,\text{i}\,b^4\,B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\text{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$6\,\mathrm{i}\,a^4\,B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-12\,\mathrm{i}\,a^2\,b^2$$

$$B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$6\,\mathrm{i}\,b^4\,B\,\text{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$

$$\mathrm{i}\,(a-b)\,\left(4\,A\,b^3+3\,a^3\,B-7\,a\,b^2\,B\right)\,\text{EllipticE}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)$$

$$\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$

$$\mathrm{i}\,(a-b)\,\left(3\,b^3\,(A-B)+6\,a^3\,B+4\,a^2\,b\,B-a\,b^2\,(A+9\,B)\right)$$

$$\text{EllipticF}\left[\mathrm{i}\,\text{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,-\frac{a+b}{a-b}\right]\,\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\right)\right)\Big/$$

$$\left(3\,b^2\,\sqrt{\frac{a-b}{a+b}}\,\left(a^2-b^2\right)^2\,d\,\left(-1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2\right)\,\sqrt{\frac{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left.\left(b\left(-1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)-a\left(1+\text{Tan}\left[\frac{1}{2}\left(c+d\,x\right)\right]^2\right)\right)\right)$$

Problem 630: Result more than twice size of optimal antiderivative.

$$\int\frac{A+B\,\text{Cos}\left[c+d\,x\right]}{\left(a+b\,\text{Cos}\left[c+d\,x\right]\right)^{5/2}\,\text{Sec}\left[c+d\,x\right]^{5/2}}\,dx$$

Optimal (type 4, 733 leaves, 9 steps):

$$\left(\left(6 a^3 A b-14 a A b^3-15 a^4 B+26 a^2 b^2 B-3 b^4 B\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\right.$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3 a\,(a-b)\, b^3\,(a+b)^{3/2}\, d\,\sqrt{\text{Sec}[c+d x]}\right)+$$

$$\left(\left(3 b^3\,(4 A-B)+15 a^3 B-a b^2\,(2 A+21 B)-a^2\,(6 A b-5 b B)\right) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\right.$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}$$

$$\left.\sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(3\,(a-b)\, b^3\,(a+b)^{3/2}\, d\,\sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(\sqrt{a+b}\ (2 A b-5 a B) \sqrt{\text{Cos}[c+d x]}\ \text{Csc}[c+d x]\ \text{EllipticPi}\left[\frac{a+b}{b},\right.\right.$$

$$\left.\left.\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d x]}}{\sqrt{a+b}\ \sqrt{\text{Cos}[c+d x]}}\right],-\frac{a+b}{a-b}\right] \sqrt{\frac{a\,(1-\text{Sec}[c+d x])}{a+b}}\ \sqrt{\frac{a\,(1+\text{Sec}[c+d x])}{a-b}}\right) \Big/$$

$$\left(b^4\, d\,\sqrt{\text{Sec}[c+d x]}\right)+\frac{2 a\,(A b-a B)\,\text{Sin}[c+d x]}{3 b\,(a^2-b^2)\, d\,(a+b\,\text{Cos}[c+d x])^{3/2}\,\text{Sec}[c+d x]^{3/2}}+$$

$$\frac{2 a\,\left(2 a^2 A b-6 A b^3-5 a^3 B+9 a b^2 B\right) \text{Sin}[c+d x]}{3 b^2\,(a^2-b^2)^2\, d\,\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}}-$$

$$\frac{1}{3 b^3\,(a^2-b^2)^2\, d}$$

$$\left(6 a^3 A b-14 a A b^3-15 a^4 B+26 a^2 b^2 B-3 b^4 B\right) \sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \text{Sin}[c+d x]$$

Result (type 4, 2342 leaves):

$$\frac{1}{d}\sqrt{a+b\,\text{Cos}[c+d x]}\ \sqrt{\text{Sec}[c+d x]}\ \left(-\frac{2 a\,\left(-3 a^2 A b+7 A b^3+6 a^3 B-10 a b^2 B\right) \text{Sin}[c+d x]}{3 b^3\,(a^2-b^2)^2}+\right.$$

$$\frac{2\,\left(-a^3 A b\,\text{Sin}[c+d x]+a^4 B\,\text{Sin}[c+d x]\right)}{3 b^3\,(-a^2+b^2)\,(a+b\,\text{Cos}[c+d x])^2}+$$

$$\left(2\,\left(-4 a^4 A b\,\text{Sin}[c+d x]+8 a^2 A b^3\,\text{Sin}[c+d x]+7 a^5 B\,\text{Sin}[c+d x]-11 a^3 b^2 B\,\text{Sin}[c+d x]\right)\right) \Big/$$

$$\left.\left(3\, b^3\, \left(-a^2+b^2\right)^2\, \left(a+b\, \text{Cos}[c+d\, x]\right)\right)\right)+$$

$$\left(\sqrt{\frac{1}{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{1+\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}}\right.$$

$$\left(6\, a^4\, A\, b\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+6\, a^3\, A\, b^2\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-14\, a^2\, A\, b^3\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-\right.$$

$$14\, a\, A\, b^4\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-15\, a^5\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-15\, a^4\, b\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+$$

$$26\, a^3\, b^2\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]+26\, a^2\, b^3\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-3\, a\, b^4\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-$$

$$3\, b^5\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]-12\, a^3\, A\, b^2\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+28\, a\, A\, b^4\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+$$

$$30\, a^4\, b\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-52\, a^2\, b^3\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3+6\, b^5\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^3-$$

$$6\, a^4\, A\, b\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+6\, a^3\, A\, b^2\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+14\, a^2\, A\, b^3\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$14\, a\, A\, b^4\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+15\, a^5\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-15\, a^4\, b\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$26\, a^3\, b^2\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+26\, a^2\, b^3\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+3\, a\, b^4\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5-$$

$$3\, b^5\, B\, \text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^5+12\, a^4\, A\, b\, \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$24\, a^2\, A\, b^3\, \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$12\, A\, b^5\, \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}-$$

$$30\, a^5\, B\, \text{EllipticPi}\left[-1,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\frac{-a+b}{a+b}\right]$$

$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}+$$

$$60\,a^3\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$30\,a\,b^4\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$
$$12\,a^4\,A\,b\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$24\,a^2\,A\,b^3\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$
$$12\,A\,b^5\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$30\,a^5\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,+$$
$$60\,a^3\,b^2\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$30\,a\,b^4\,B\,\text{EllipticPi}\left[-1,\,-\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]\right],\,\frac{-a+b}{a+b}\right]\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2$$
$$\sqrt{1-\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}\,\sqrt{\frac{a+b+a\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2-b\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^2}{a+b}}\,-$$
$$(a+b)\,\left(-6\,a^3\,A\,b+14\,a\,A\,b^3+15\,a^4\,B-26\,a^2\,b^2\,B+3\,b^4\,B\right)$$

$$\text{EllipticE}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}+$$

$$2 b (a+b) \left(3 A b^3+3 a b^2 (A-2 B)+5 a^3 B-a^2 b (2 A+3 B)\right)$$

$$\text{EllipticF}\left[\text{ArcSin}\left[\text{Tan}\left[\frac{1}{2}(c+d x)\right]\right], \frac{-a+b}{a+b}\right] \sqrt{1-\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}$$

$$\left.\left.\left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right) \sqrt{\frac{a+b+a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2-b \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2}{a+b}}\right)\right) \Big/$$

$$\left(3 b^3 \left(a^2-b^2\right)^2 d \sqrt{1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2} \left(b \left(-1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)-a \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)\right)\right)$$

Problem 631: Unable to integrate problem.

$$\int \frac{(a B+b B \text{Cos}[c+d x]) \text{Sec}[c+d x]^{3/2}}{(a+b \text{Cos}[c+d x])^{3/2}} \, dx$$

Optimal (type 4, 266 leaves, 5 steps):

$$\left(2 (a-b) \sqrt{a+b}\, B \sqrt{\text{Cos}[c+d x]}\, \text{Csc}[c+d x]\, \text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]\right.$$

$$\left.\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(a^2 d \sqrt{\text{Sec}[c+d x]}\right)-$$

$$\left(2 \sqrt{a+b}\, B \sqrt{\text{Cos}[c+d x]}\, \text{Csc}[c+d x]\, \text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b \text{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\text{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right]\right.$$

$$\left.\sqrt{\frac{a (1-\text{Sec}[c+d x])}{a+b}} \sqrt{\frac{a (1+\text{Sec}[c+d x])}{a-b}}\right) \Big/ \left(a d \sqrt{\text{Sec}[c+d x]}\right)$$

Result (type 8, 40 leaves):

$$\int \frac{(a B+b B \text{Cos}[c+d x]) \text{Sec}[c+d x]^{3/2}}{(a+b \text{Cos}[c+d x])^{3/2}} \, dx$$

Problem 633: Unable to integrate problem.

$$\int \frac{a B + b B \operatorname{Cos}[c + d x]}{(a + b \operatorname{Cos}[c + d x])^{3/2} \sqrt{\operatorname{Sec}[c + d x]}} \, dx$$

Optimal (type 4, 137 leaves, 3 steps):

$$-\left(\left(2 \sqrt{a+b}\, B \sqrt{\operatorname{Cos}[c+d x]}\, \operatorname{Csc}[c+d x]\, \operatorname{EllipticPi}\left[\frac{a+b}{b}, \operatorname{ArcSin}\left[\frac{\sqrt{a+b \operatorname{Cos}[c+d x]}}{\sqrt{a+b} \sqrt{\operatorname{Cos}[c+d x]}}\right], -\frac{a+b}{a-b}\right] \sqrt{\frac{a\,(1-\operatorname{Sec}[c+d x])}{a+b}} \sqrt{\frac{a\,(1+\operatorname{Sec}[c+d x])}{a-b}}\right) \Big/ \left(b\, d \sqrt{\operatorname{Sec}[c+d x]}\right)\right)$$

Result (type 8, 40 leaves):

$$\int \frac{a B + b B \operatorname{Cos}[c + d x]}{(a + b \operatorname{Cos}[c + d x])^{3/2} \sqrt{\operatorname{Sec}[c + d x]}} \, dx$$

Problem 634: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{a B + b B \operatorname{Cos}[c + d x]}{(a + b \operatorname{Cos}[c + d x])^{3/2} \operatorname{Sec}[c + d x]^{3/2}} \, dx$$

Optimal (type 4, 479 leaves, 10 steps):

$$-\left(\left((a-b)\sqrt{a+b}\,B\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticE}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\right.\right.$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\bigg/\left.\left(a\,b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)\right)+$$

$$\left(\sqrt{a+b}\,B\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],-\frac{a+b}{a-b}\right]\right.$$

$$\left.\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\bigg/\left(b\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\left(a\sqrt{a+b}\,B\sqrt{\text{Cos}[c+d\,x]}\,\text{Csc}[c+d\,x]\,\text{EllipticPi}\left[\frac{a+b}{b},\text{ArcSin}\left[\frac{\sqrt{a+b\,\text{Cos}[c+d\,x]}}{\sqrt{a+b}\,\sqrt{\text{Cos}[c+d\,x]}}\right],\right.\right.$$

$$\left.\left.-\frac{a+b}{a-b}\right]\sqrt{\frac{a\,(1-\text{Sec}[c+d\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Sec}[c+d\,x])}{a-b}}\right)\bigg/\left(b^2\,d\,\sqrt{\text{Sec}[c+d\,x]}\right)+$$

$$\frac{B\,\text{Sin}[c+d\,x]}{d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}\,\sqrt{\text{Sec}[c+d\,x]}}+\frac{a\,B\,\sqrt{\text{Sec}[c+d\,x]}\,\text{Sin}[c+d\,x]}{b\,d\,\sqrt{a+b\,\text{Cos}[c+d\,x]}}$$

Result (type 4, 760 leaves) :

$$\frac{1}{b\sqrt{\frac{a-b}{a+b}}\,d\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)^{3/2}\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}}$$

$$B\sqrt{\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}}\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}$$

$$\left(a\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}+b\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]\right.$$

$$\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}+a\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^3\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}-$$

$$b\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^3\sqrt{1-\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}+$$

$$2\,\mathrm{i}\,a\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}+$$

$$2\,\mathrm{i}\,a\,\mathrm{EllipticPi}\left[\frac{a+b}{a-b},\,\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}+$$

$$\mathrm{i}\,(a-b)\,\mathrm{EllipticE}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}-$$

$$2\,\mathrm{i}\,a\,\mathrm{EllipticF}\left[\mathrm{i}\,\mathrm{ArcSinh}\left[\sqrt{\frac{a-b}{a+b}}\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]\right],\,-\frac{a+b}{a-b}\right]$$

$$\left.\left(1+\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2\right)\sqrt{\frac{a+b+a\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2-b\,\mathrm{Tan}\left[\frac{1}{2}(c+dx)\right]^2}{a+b}}\right)$$

Problem 637: Result more than twice size of optimal antiderivative.

$$\int (a+b\,\text{Cos}[e+f\,x])^3\,(A+B\,\text{Cos}[e+f\,x])\,(c\,\text{Sec}[e+f\,x])^m\,dx$$

Optimal (type 5, 455 leaves, 9 steps):

$$-\left(\left(c^5\left(a^3 A\left(8-6m+m^2\right)+3\,a\,A\,b^2\left(4-5m+m^2\right)+3\,a^2\,b\,B\left(4-5m+m^2\right)+b^3 B\left(3-4m+m^2\right)\right)\right.\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{5-m}{2},\frac{7-m}{2},\text{Cos}[e+f\,x]^2\right](c\,\text{Sec}[e+f\,x])^{-5+m}\,\text{Sin}[e+f\,x]\right)\Big/$$
$$\left.\left(f\,(1-m)\,(3-m)\,(5-m)\sqrt{\text{Sin}[e+f\,x]^2}\right)\right)-$$
$$\left(c^4\left(A\,b^3\,(2-m)+3\,a\,b^2\,B\,(2-m)+3\,a^2\,A\,b\,(3-m)+a^3\,B\,(3-m)\right)\right.$$
$$\left.\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{4-m}{2},\frac{6-m}{2},\text{Cos}[e+f\,x]^2\right](c\,\text{Sec}[e+f\,x])^{-4+m}\,\text{Sin}[e+f\,x]\right)\Big/$$
$$\left(f\,(2-m)\,(4-m)\sqrt{\text{Sin}[e+f\,x]^2}\right)-\frac{1}{f\,(1-m)\,(3-m)}$$
$$a\,c^4\left(3\,a\,b\,B\,(1-m)+a^2\,A\,(2-m)-2\,A\,b^2\,m\right)(c\,\text{Sec}[e+f\,x])^{-4+m}\,\text{Tan}[e+f\,x]-$$
$$\frac{1}{f\,(1-m)\,(2-m)}$$
$$a^2\,c^4\left(a\,B\,(1-m)-A\,b\,(1+m)\right)\text{Sec}[e+f\,x]\,(c\,\text{Sec}[e+f\,x])^{-4+m}\,\text{Tan}[e+f\,x]-$$
$$\frac{a\,A\,c^4\,(c\,\text{Sec}[e+f\,x])^{-4+m}\,(b+a\,\text{Sec}[e+f\,x])^2\,\text{Tan}[e+f\,x]}{f\,(1-m)}$$

Result (type 5, 966 leaves):

$$\Bigg(8\,\text{Cos}[e+f x]^4\,(c\,\text{Sec}[e+f x])^m\,\left(\text{Sec}[e+f x]^2\right)^{\frac{1-m}{2}}\,(b+a\,\text{Sec}[e+f x])^3$$

$$(B+A\,\text{Sec}[e+f x])\,\Bigg(a^3\,A\,\text{Hypergeometric2F1}\Big[\frac{1}{2},3-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]+$$

$$3\,a\,A\,b^2\,\text{Hypergeometric2F1}\Big[\frac{1}{2},3-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]+$$

$$3\,a^2\,b\,B\,\text{Hypergeometric2F1}\Big[\frac{1}{2},3-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]+$$

$$b^3\,B\,\text{Hypergeometric2F1}\Big[\frac{1}{2},3-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]+$$

$$3\,a^2\,A\,b\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{7}{2}-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]+$$

$$A\,b^3\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{7}{2}-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]+$$

$$a^3\,B\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{7}{2}-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]+$$

$$3\,a\,b^2\,B\,\text{Hypergeometric2F1}\Big[\frac{1}{2},\frac{7}{2}-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]+$$

$$\frac{2}{3}\,a^3\,A\,\text{Hypergeometric2F1}\Big[\frac{3}{2},3-\frac{m}{2},\frac{5}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^3+$$

$$a\,A\,b^2\,\text{Hypergeometric2F1}\Big[\frac{3}{2},3-\frac{m}{2},\frac{5}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^3+$$

$$a^2\,b\,B\,\text{Hypergeometric2F1}\Big[\frac{3}{2},3-\frac{m}{2},\frac{5}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^3+$$

$$2\,a^2\,A\,b\,\text{Hypergeometric2F1}\Big[\frac{3}{2},\frac{7}{2}-\frac{m}{2},\frac{5}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^3+$$

$$\frac{1}{3}\,A\,b^3\,\text{Hypergeometric2F1}\Big[\frac{3}{2},\frac{7}{2}-\frac{m}{2},\frac{5}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^3+$$

$$\frac{2}{3}\,a^3\,B\,\text{Hypergeometric2F1}\Big[\frac{3}{2},\frac{7}{2}-\frac{m}{2},\frac{5}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^3+$$

$$a\,b^2\,B\,\text{Hypergeometric2F1}\Big[\frac{3}{2},\frac{7}{2}-\frac{m}{2},\frac{5}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^3+$$

$$\frac{1}{5}\,a^3\,A\,\text{Hypergeometric2F1}\Big[\frac{5}{2},3-\frac{m}{2},\frac{7}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^5+$$

$$\frac{3}{5}\,a^2\,A\,b\,\text{Hypergeometric2F1}\Big[\frac{5}{2},\frac{7}{2}-\frac{m}{2},\frac{7}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^5+$$

$$\frac{1}{5}\,a^3\,B\,\text{Hypergeometric2F1}\Big[\frac{5}{2},\frac{7}{2}-\frac{m}{2},\frac{7}{2},-\text{Tan}[e+f x]^2\Big]\,\text{Tan}[e+f x]^5\Bigg)\Bigg)\Big/$$

$$\Bigg(f\,\Bigg(24\,a^2\,A\,b+4\,A\,b^3+8\,a^3\,B+12\,a\,b^2\,B+8\,a^3\,A\,\sqrt{\text{Sec}[e+f x]^2}+12\,a\,A\,b^2\,\sqrt{\text{Sec}[e+f x]^2}+$$

$$12\,a^2\,b\,B\,\sqrt{\text{Sec}[e+f x]^2}+3\,b^3\,B\,\sqrt{\text{Sec}[e+f x]^2}+$$

$$b^3\,B\,\text{Cos}[4\,(e+f x)]\,\sqrt{\text{Sec}[e+f x]^2}+4\,b\,\text{Cos}[2\,(e+f x)]$$

$$\left(A\,b\,\left(b+3\,a\,\sqrt{\text{Sec}[e+f x]^2}\right)+B\,\left(3\,a\,b+3\,a^2\,\sqrt{\text{Sec}[e+f x]^2}+b^2\,\sqrt{\text{Sec}[e+f x]^2}\right)\right)\Bigg)\Bigg)$$

Problem 639: Result unnecessarily involves higher level functions and more

than twice size of optimal antiderivative.

$$\int (a+b\,\mathrm{Cos}[e+f\,x])\,(A+B\,\mathrm{Cos}[e+f\,x])\,(c\,\mathrm{Sec}[e+f\,x])^m\,dx$$

Optimal (type 5, 217 leaves, 7 steps):

$$-\left(\left(c^3\,(b\,B\,(1-m)+a\,A\,(2-m))\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3-m}{2},\frac{5-m}{2},\mathrm{Cos}[e+f\,x]^2\right]\,(c\,\mathrm{Sec}[e+f\,x])^{-3+m}\,\mathrm{Sin}[e+f\,x]\right)\Big/\left(f\,(1-m)\,(3-m)\,\sqrt{\mathrm{Sin}[e+f\,x]^2}\right)\right)-\left((A\,b+a\,B)\,c^2\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{2-m}{2},\frac{4-m}{2},\mathrm{Cos}[e+f\,x]^2\right]\,(c\,\mathrm{Sec}[e+f\,x])^{-2+m}\,\mathrm{Sin}[e+f\,x]\right)\Big/\left(f\,(2-m)\,\sqrt{\mathrm{Sin}[e+f\,x]^2}\right)-\frac{a\,A\,c^2\,(c\,\mathrm{Sec}[e+f\,x])^{-2+m}\,\mathrm{Tan}[e+f\,x]}{f\,(1-m)}$$

Result (type 6, 16 794 leaves):

$$\Bigg(6\,\mathrm{Sec}[e+f\,x]^{-m}\,(c\,\mathrm{Sec}[e+f\,x])^m\,\left(b\,B\,\mathrm{Sec}[e+f\,x]^{-2+m}+a\,A\,\mathrm{Sec}[e+f\,x]^m+\mathrm{Cos}[e+f\,x]\,(A\,b\,\mathrm{Sec}[e+f\,x]^m+a\,B\,\mathrm{Sec}[e+f\,x]^m)\right)\,\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]\left(\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2}\right)^m\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^{-3+m}$$

$$\Bigg(\Bigg(a\,A\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^2\Bigg)\Big/$$

$$\Bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+2\left((-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+m\,\mathrm{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Bigg)-$$

$$\Bigg(A\,b\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^2\Bigg)\Big/$$

$$\Bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+2\left((-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+m\,\mathrm{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Bigg)-$$

$$\Bigg(a\,B\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right)^2\Bigg)\Bigg/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+2$$
$$\Bigg(\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+m\,\text{AppellF1}\Big[$$
$$\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]\Bigg)\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Bigg)+$$
$$\Bigg(b\,B\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]$$
$$\left(1+\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right)^2\Bigg)\Bigg/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+2$$
$$\Bigg(\left(-1+m\right)\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+m\,\text{AppellF1}\Big[$$
$$\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]\Bigg)\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Bigg)+$$
$$\Bigg(2\,A\,b\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]$$
$$\left(1+\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right)\Bigg)\Bigg/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+2$$
$$\Bigg(\left(-2+m\right)\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+m\,\text{AppellF1}\Big[$$
$$\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]\Bigg)\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Bigg)+$$
$$\Bigg(2\,a\,B\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]$$
$$\left(1+\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right)\Bigg)\Bigg/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+2$$
$$\Bigg(\left(-2+m\right)\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+m\,\text{AppellF1}\Big[$$
$$\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]\Bigg)\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Bigg)-$$
$$\Bigg(4\,b\,B\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]$$
$$\left(1+\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right)\Bigg)\Bigg/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+2$$
$$\Bigg(\left(-2+m\right)\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+m\,\text{AppellF1}\Big[$$

$$\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) +$$

$$\Big(4 b B \text{AppellF1}\left[\frac{1}{2}, m, 3-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big) \Big/$$

$$\Big(3 \text{AppellF1}\left[\frac{1}{2}, m, 3-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2$$

$$\Big(\big(-3+m\big) \text{AppellF1}\left[\frac{3}{2}, m, 4-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + m \text{AppellF1}\Big[$$

$$\frac{3}{2}, 1+m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)\Big) \Big/$$

$$\Bigg(f \Bigg(6 \big(-3+m\big) \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2 \left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^m$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-4+m} \Bigg(\Big(a A \text{AppellF1}\Big[\frac{1}{2}, m, 1-m, \frac{3}{2},$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] \left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big) \Big/$$

$$\Big(3 \text{AppellF1}\left[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Big(\big(-1+m\big) \text{AppellF1}\left[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$m \text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) - \Big(A b \text{AppellF1}\Big[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] \left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big) \Big/$$

$$\Big(3 \text{AppellF1}\left[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Big(\big(-1+m\big) \text{AppellF1}\left[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$m \text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) - \Big(a B \text{AppellF1}\Big[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] \left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big) \Big/$$

$$\Big(3 \text{AppellF1}\left[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Big(\big(-1+m\big) \text{AppellF1}\left[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$m \text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) + \Big(b B \text{AppellF1}\Big[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$

$$2\,\Big(\left(-1+m\right)\text{AppellF1}\Big[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+\Big(2\,A\,b\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$

$$2\,\Big(\left(-2+m\right)\text{AppellF1}\Big[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+\Big(2\,a\,B\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$

$$2\,\Big(\left(-2+m\right)\text{AppellF1}\Big[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-\Big(4\,b\,B\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+2\,\Big(\left(-2+m\right)$$

$$\text{AppellF1}\Big[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},$$

$$1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$

$$\Big(4\,b\,B\,\text{AppellF1}\Big[\frac{1}{2},m,3-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,3-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+2\,\Big(\left(-3+m\right)$$

$$\text{AppellF1}\Big[\frac{3}{2},m,4-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},$$

$$1+m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)+$$

$$3\,\mathrm{Sec}\left[\frac{1}{2}(e+fx)\right]^2\left(\frac{1}{1-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2}\right)^m\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^{-3+m}$$

$$\Bigg(\Bigg(\Bigg(a\,A\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\Bigg)\Big/$$

$$\Bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\Bigg((-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\mathrm{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)-$$

$$\Bigg(A\,b\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\Bigg)\Big/$$

$$\Bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\Bigg((-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\mathrm{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)-$$

$$\Bigg(a\,B\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\Bigg)\Big/$$

$$\Bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\Bigg((-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\mathrm{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)+$$

$$\Bigg(b\,B\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\Bigg)\Big/$$

$$\Bigg(3\,\mathrm{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\Bigg((-1+m)\,\mathrm{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\mathrm{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)+$$

$$\Bigg(2\,A\,b\,\mathrm{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\mathrm{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/$$
$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$
$$2\Big((-2+m)\,\text{AppellF1}\Big[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$
$$m\,\text{AppellF1}\Big[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)$$
$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+\Big(2\,a\,B\,\text{AppellF1}\Big[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$
$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/$$
$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$
$$2\Big((-2+m)\,\text{AppellF1}\Big[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$
$$m\,\text{AppellF1}\Big[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)$$
$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-\Big(4\,b\,B\,\text{AppellF1}\Big[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$
$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/$$
$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+2\Big((-2+m)$$
$$\text{AppellF1}\Big[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},$$
$$1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+$$
$$\Big(4\,b\,B\,\text{AppellF1}\Big[\frac{1}{2}, m, 3-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)\Big/$$
$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2}, m, 3-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+2\Big((-3+m)$$
$$\text{AppellF1}\Big[\frac{3}{2}, m, 4-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},$$
$$1+m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big)+$$
$$6\,m\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^{1+m}$$
$$\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^{-3+m}$$
$$\Big(\Big(a\,A\,\text{AppellF1}\Big[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]$$
$$\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-\left(A\,b\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-\left(a\,B\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+\left(b\,B\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)+\left(2\,A\,b\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left((-2+m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$

$$\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)+\Big(2 a B\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big(1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$2\Big((-2+m)\,\text{AppellF1}\Big[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)$$

$$\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)-\Big(4 b B\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big(1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+2\Big((-2+m)$$

$$\text{AppellF1}\Big[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},$$

$$1+m,2-m,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)+$$

$$\Big(4 b B\,\text{AppellF1}\Big[\frac{1}{2},m,3-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,3-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+2\Big((-3+m)$$

$$\text{AppellF1}\Big[\frac{3}{2},m,4-m,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},$$

$$1+m,3-m,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)+$$

$$6\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\left(\frac{1}{1-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2}\right)^m\Big(1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^{-3+m}$$

$$\Big(\Big(2 a A\,\text{AppellF1}\Big[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big(1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+2\Big((-1+m)$$

$$\text{AppellF1}\Big[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},$$

$$1+m,1-m,\frac{5}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)-$$

$$\Big(2 A b\,\text{AppellF1}\Big[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]\Big(1+\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)\Big)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$

$$\left(2\,a\,B\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)+$$

$$\left(2\,b\,B\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)+\left(a\,A\left(-\frac{1}{3}(1-m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\right)\Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-\left(A\,b\left(-\frac{1}{3}(1-m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right.\right.$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big) \Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\left(\left(-1+m\right) \text{AppellF1}\left[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$\left. m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) - \Big(a\,B\,\Big(-\frac{1}{3}(1-m)\,\text{AppellF1}\left[\frac{3}{2}, m, 2-m, \frac{5}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{1}{3} m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big) \Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\left(\left(-1+m\right) \text{AppellF1}\left[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$\left. m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) + \Big(b\,B\,\Big(-\frac{1}{3}(1-m)\,\text{AppellF1}\left[\frac{3}{2}, m, 2-m, \frac{5}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{1}{3} m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big) \Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\left(\left(-1+m\right) \text{AppellF1}\left[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$\left. m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) + \Big(2\,A\,b\,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) \Big/$$

$$\Big(3\,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\left(\left(-2+m\right) \text{AppellF1}\left[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

$$\left. m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) + \Big(2 a B \,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) \Big/$$

$$\Big(3 \,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Big((-2+m) \,\text{AppellF1}\left[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$m \,\text{AppellF1}\left[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) - \Big(4 b B \,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) \Big/$$

$$\Big(3 \,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Big((-2+m) \,\text{AppellF1}\left[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$m \,\text{AppellF1}\left[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) + \Big(2 A b \Big(-\frac{1}{3}(2-m) \,\text{AppellF1}\left[\frac{3}{2}, m, 3-m, \frac{5}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{1}{3} m \,\text{AppellF1}\left[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) \Big(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big) \Big/$$

$$\Big(3 \,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Big((-2+m) \,\text{AppellF1}\left[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$m \,\text{AppellF1}\left[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) + \Big(2 a B \Big(-\frac{1}{3}(2-m) \,\text{AppellF1}\left[\frac{3}{2}, m, 3-m, \frac{5}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$\frac{1}{3} m \,\text{AppellF1}\left[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) \Big(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big) \Big/$$

$$\Big(3 \,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2 \Big((-2+m) \,\text{AppellF1}\left[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$
\begin{aligned}
&m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\\
&\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-\Big(4\,b\,B\,\Big(-\frac{1}{3}(2-m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\right.\\
&\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\\
&\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\\
&\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/\\
&\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\\
&2\,\Big((-2+m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\\
&m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\\
&\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+\\
&\Big(4\,b\,B\,\Big(-\frac{1}{3}(3-m)\,\text{AppellF1}\left[\frac{3}{2},m,4-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\\
&\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,3-m,\frac{5}{2},\right.\\
&\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big)\Big/\\
&\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,3-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\\
&2\,\Big((-3+m)\,\text{AppellF1}\left[\frac{3}{2},m,4-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\\
&m\,\text{AppellF1}\left[\frac{3}{2},1+m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\\
&\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)-\Big(a\,A\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\\
&\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\\
&\Big(2\,\Big((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\\
&m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)\\
&\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+3\,\Big(-\frac{1}{3}(1-m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\right.\\
&\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+\\
&\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\\
&\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)+2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2
\end{aligned}
$$

$$\Big(\Big((-1+m)\,\Big(-\frac{3}{5}\,(2-m)\,\text{AppellF1}\Big[\frac{5}{2},\,m,\,3-m,\,\frac{7}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+$$

$$\frac{3}{5}\,m\,\text{AppellF1}\Big[\frac{5}{2},\,1+m,\,2-m,\,\frac{7}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)+m\,\Big(-\frac{3}{5}\,(1-m)\,\text{AppellF1}\Big[\frac{5}{2},\,1+m,$$

$$2-m,\,\frac{7}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[$$

$$\frac{1}{2}\,(e+f\,x)\Big]+\frac{3}{5}\,(1+m)\,\text{AppellF1}\Big[\frac{5}{2},\,2+m,\,1-m,\,\frac{7}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(3\,\text{AppellF1}\Big[\frac{1}{2},\,m,\,1-m,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$2\,\Big((-1+m)\,\text{AppellF1}\Big[\frac{3}{2},\,m,\,2-m,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$m\,\text{AppellF1}\Big[\frac{3}{2},\,1+m,\,1-m,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)^2+$$

$$\Big(A\,b\,\text{AppellF1}\Big[\frac{1}{2},\,m,\,1-m,\,\frac{3}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]$$

$$\Big(1+\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)^2\,\Big(2\,\Big((-1+m)\,\text{AppellF1}\Big[\frac{3}{2},\,m,\,2-m,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+m\,\text{AppellF1}\Big[\frac{3}{2},\,1+m,\,1-m,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+$$

$$3\,\Big(-\frac{1}{3}\,(1-m)\,\text{AppellF1}\Big[\frac{3}{2},\,m,\,2-m,\,\frac{5}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+\frac{1}{3}\,m\,\text{AppellF1}\Big[\frac{3}{2},\,1+m,\,1-m,\,\frac{5}{2},$$

$$\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)+$$

$$2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\Big((-1+m)\,\Big(-\frac{3}{5}\,(2-m)\,\text{AppellF1}\Big[\frac{5}{2},\,m,\,3-m,\,\frac{7}{2},\,\text{Tan}\Big[$$

$$\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]+$$

$$\frac{3}{5}\,m\,\text{AppellF1}\Big[\frac{5}{2},\,1+m,\,2-m,\,\frac{7}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]\Big)+m\,\Big(-\frac{3}{5}\,(1-m)\,\text{AppellF1}\Big[\frac{5}{2},\,1+m,$$

$$2-m,\,\frac{7}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\,\text{Tan}\Big[$$

$$\frac{1}{2}\,(e+f x)] + \frac{3}{5}\,(1+m)\,\text{AppellF1}[\frac{5}{2}, 2+m, 1-m, \frac{7}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2,$$

$$-\text{Tan}[\frac{1}{2}\,(e+f x)]^2]\,\text{Sec}[\frac{1}{2}\,(e+f x)]^2\,\text{Tan}[\frac{1}{2}\,(e+f x)]]))))\Big/$$

$$(3\,\text{AppellF1}[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2] +$$

$$2\,((-1+m)\,\text{AppellF1}[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2] +$$

$$m\,\text{AppellF1}[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2,$$

$$-\text{Tan}[\frac{1}{2}\,(e+f x)]^2])\,\text{Tan}[\frac{1}{2}\,(e+f x)]^2)^2 +$$

$$(a\,B\,\text{AppellF1}[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2]$$

$$(1+\text{Tan}[\frac{1}{2}\,(e+f x)]^2)^2$$

$$(2\,((-1+m)\,\text{AppellF1}[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2] +$$

$$m\,\text{AppellF1}[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2])$$

$$\text{Sec}[\frac{1}{2}\,(e+f x)]^2\,\text{Tan}[\frac{1}{2}\,(e+f x)] + 3\,(-\frac{1}{3}\,(1-m)\,\text{AppellF1}[\frac{3}{2}, m, 2-m, \frac{5}{2},$$

$$\text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2]\,\text{Sec}[\frac{1}{2}\,(e+f x)]^2\,\text{Tan}[\frac{1}{2}\,(e+f x)] +$$

$$\frac{1}{3}\,m\,\text{AppellF1}[\frac{3}{2}, 1+m, 1-m, \frac{5}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2]$$

$$\text{Sec}[\frac{1}{2}\,(e+f x)]^2\,\text{Tan}[\frac{1}{2}\,(e+f x)]) + 2\,\text{Tan}[\frac{1}{2}\,(e+f x)]^2$$

$$((-1+m)\,(-\frac{3}{5}\,(2-m)\,\text{AppellF1}[\frac{5}{2}, m, 3-m, \frac{7}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2,$$

$$-\text{Tan}[\frac{1}{2}\,(e+f x)]^2]\,\text{Sec}[\frac{1}{2}\,(e+f x)]^2\,\text{Tan}[\frac{1}{2}\,(e+f x)] +$$

$$\frac{3}{5}\,m\,\text{AppellF1}[\frac{5}{2}, 1+m, 2-m, \frac{7}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2]$$

$$\text{Sec}[\frac{1}{2}\,(e+f x)]^2\,\text{Tan}[\frac{1}{2}\,(e+f x)]) + m\,(-\frac{3}{5}\,(1-m)\,\text{AppellF1}[\frac{5}{2}, 1+m,$$

$$2-m, \frac{7}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2]\,\text{Sec}[\frac{1}{2}\,(e+f x)]^2\,\text{Tan}[$$

$$\frac{1}{2}\,(e+f x)] + \frac{3}{5}\,(1+m)\,\text{AppellF1}[\frac{5}{2}, 2+m, 1-m, \frac{7}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2,$$

$$-\text{Tan}[\frac{1}{2}\,(e+f x)]^2]\,\text{Sec}[\frac{1}{2}\,(e+f x)]^2\,\text{Tan}[\frac{1}{2}\,(e+f x)]]))))\Big/$$

$$(3\,\text{AppellF1}[\frac{1}{2}, m, 1-m, \frac{3}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2] +$$

$$2\,((-1+m)\,\text{AppellF1}[\frac{3}{2}, m, 2-m, \frac{5}{2}, \text{Tan}[\frac{1}{2}\,(e+f x)]^2, -\text{Tan}[\frac{1}{2}\,(e+f x)]^2] +$$

$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2-$$
$$\left(b\,B\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right.$$
$$\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2$$
$$\left(2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)$$
$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+3\left(-\frac{1}{3}(1-m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\right.\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$
$$\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$
$$\left.\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$
$$\left((-1+m)\left(-\frac{3}{5}(2-m)\,\text{AppellF1}\left[\frac{5}{2},m,3-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$
$$\frac{3}{5}m\,\text{AppellF1}\left[\frac{5}{2},1+m,2-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$
$$\left.\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+m\left(-\frac{3}{5}(1-m)\,\text{AppellF1}\left[\frac{5}{2},1+m,\right.\right.$$
$$2-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\right.$$
$$\left.\frac{1}{2}(e+fx)\right]+\frac{3}{5}(1+m)\,\text{AppellF1}\left[\frac{5}{2},2+m,1-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$
$$\left.\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,1-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$2\left((-1+m)\,\text{AppellF1}\left[\frac{3}{2},m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,1-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2-$$
$$\left(2\,A\,b\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right.$$
$$\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)$$

$$\left(2\left((-2+m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)$$
$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+3\left(-\frac{1}{3}(2-m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\right.\right.$$
$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$
$$\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$
$$\left.\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$
$$\left((-2+m)\left(-\frac{3}{5}(3-m)\,\text{AppellF1}\left[\frac{5}{2},m,4-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.\right.\right.$$
$$-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$
$$\frac{3}{5}m\,\text{AppellF1}\left[\frac{5}{2},1+m,3-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$
$$\left.\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)+m\left(-\frac{3}{5}(2-m)\,\text{AppellF1}\left[\frac{5}{2},1+m,\right.\right.$$
$$3-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\right.$$
$$\left.\frac{1}{2}(e+fx)\right]+\frac{3}{5}(1+m)\,\text{AppellF1}\left[\frac{5}{2},2+m,2-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$
$$\left.\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\right)\right)\Big/$$
$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$2\left((-2+m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.$$
$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$
$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2-$$
$$\left(2\,a\,B\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right.$$
$$\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)$$
$$\left(2\left((-2+m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+\right.\right.$$
$$\left.m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)$$
$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+3\left(-\frac{1}{3}(2-m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\right.\right.$$
$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$\frac{1}{3}\,m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)+2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$
$$\Big(\,(-2+m)\,\Big(-\frac{3}{5}(3-m)\,\text{AppellF1}\left[\frac{5}{2},m,4-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$
$$\frac{3}{5}\,m\,\text{AppellF1}\left[\frac{5}{2},1+m,3-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)+m\,\Big(-\frac{3}{5}(2-m)\,\text{AppellF1}\Big[\frac{5}{2},1+m,$$
$$3-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\Big[$$
$$\frac{1}{2}(e+f x)\Big]+\frac{3}{5}(1+m)\,\text{AppellF1}\Big[\frac{5}{2},2+m,2-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$
$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big)\Big)\Big)\Big)\Big/$$
$$\Big(3\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$2\,\Big(\,(-2+m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$m\,\text{AppellF1}\Big[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$
$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)^2+$$
$$\Big(4\,b\,B\,\text{AppellF1}\left[\frac{1}{2},m,2-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\left(1+\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)$$
$$\Big(2\,\Big(\,(-2+m)\,\text{AppellF1}\left[\frac{3}{2},m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$
$$m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+3\,\Big(-\frac{1}{3}(2-m)\,\text{AppellF1}\Big[\frac{3}{2},m,3-m,\frac{5}{2},$$
$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$
$$\frac{1}{3}\,m\,\text{AppellF1}\left[\frac{3}{2},1+m,2-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)+2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$
$$\Big(\,(-2+m)\,\Big(-\frac{3}{5}(3-m)\,\text{AppellF1}\Big[\frac{5}{2},m,4-m,\frac{7}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$
$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]+$$

$$\frac{3}{5} m \,\text{AppellF1}\left[\frac{5}{2}, 1+m, 3-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg) + m\left(-\frac{3}{5}(2-m)\,\text{AppellF1}\left[\frac{5}{2}, 1+m,\right.\right.$$
$$3-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\Big[$$
$$\frac{1}{2}(e+f x)\Big] + \frac{3}{5}(1+m)\,\text{AppellF1}\left[\frac{5}{2}, 2+m, 2-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg) \Big/$$
$$\Bigg(3\,\text{AppellF1}\left[\frac{1}{2}, m, 2-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$
$$2\Bigg(\left(-2+m\right)\text{AppellF1}\left[\frac{3}{2}, m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$
$$m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 2-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)^2 -$$
$$\Bigg(4\,b\,B\,\text{AppellF1}\left[\frac{1}{2}, m, 3-m, \frac{3}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\Bigg(2\Bigg(\left(-3+m\right)\text{AppellF1}\left[\frac{3}{2}, m, 4-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$
$$m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + 3\left(-\frac{1}{3}(3-m)\,\text{AppellF1}\left[\frac{3}{2}, m, 4-m, \frac{5}{2},\right.\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$
$$\frac{1}{3} m\,\text{AppellF1}\left[\frac{3}{2}, 1+m, 3-m, \frac{5}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\left.\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) + 2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$
$$\Bigg(\left(-3+m\right)\left(-\frac{3}{5}(4-m)\,\text{AppellF1}\left[\frac{5}{2}, m, 5-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$
$$\frac{3}{5} m\,\text{AppellF1}\left[\frac{5}{2}, 1+m, 4-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg) + m\left(-\frac{3}{5}(3-m)\,\text{AppellF1}\left[\frac{5}{2}, 1+m,\right.\right.$$
$$4-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\Big[$$
$$\frac{1}{2}(e+f x)\Big] + \frac{3}{5}(1+m)\,\text{AppellF1}\left[\frac{5}{2}, 2+m, 3-m, \frac{7}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg) \Big/$$

$$\left(3\,\text{AppellF1}\left[\frac{1}{2},m,3-m,\frac{3}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\left((-3+m)\,\text{AppellF1}\left[\frac{3}{2},m,4-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+m\,\text{AppellF1}\left[\frac{3}{2},1+m,3-m,\frac{5}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\right)$$

Problem 640: Result more than twice size of optimal antiderivative.

$$\int \frac{(A+B\,\text{Cos}[e+f x])\,(c\,\text{Sec}[e+f x])^m}{a+b\,\text{Cos}[e+f x]}\,dx$$

Optimal (type 6, 299 leaves, 10 steps):

$$-\frac{1}{(a^2-b^2)\,c\,f}(A b-a B)\,\text{AppellF1}\left[\frac{1}{2},\frac{m}{2},1,\frac{3}{2},\text{Sin}[e+f x]^2,-\frac{b^2\,\text{Sin}[e+f x]^2}{a^2-b^2}\right]\text{Cos}[e+f x]\,(\text{Cos}[e+f x]^2)^{m/2}\,(c\,\text{Sec}[e+f x])^{1+m}\,\text{Sin}[e+f x]+\frac{1}{b\,(a^2-b^2)\,c\,f}a\,(A b-a B)\,\text{AppellF1}\left[\frac{1}{2},\frac{1+m}{2},1,\frac{3}{2},\text{Sin}[e+f x]^2,-\frac{b^2\,\text{Sin}[e+f x]^2}{a^2-b^2}\right](\text{Cos}[e+f x]^2)^{\frac{1+m}{2}}\,(c\,\text{Sec}[e+f x])^{1+m}\,\text{Sin}[e+f x]-\left(B\,c\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1-m}{2},\frac{3-m}{2},\text{Cos}[e+f x]^2\right](c\,\text{Sec}[e+f x])^{-1+m}\,\text{Sin}[e+f x]\right)\Big/\left(b\,f\,(1-m)\,\sqrt{\text{Sin}[e+f x]^2}\right)$$

Result (type 6, 10 630 leaves):

$$\left(\text{Sec}[e+f x]^{1-m}\,(c\,\text{Sec}[e+f x])^m\left(\frac{B\,\text{Sec}[e+f x]^{-1+m}}{a+b\,\text{Cos}[e+f x]}+\frac{A\,\text{Sec}[e+f x]^m}{a+b\,\text{Cos}[e+f x]}\right)\text{Sin}[e+f x]\left(\frac{A\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right]}{b}-\frac{a\,B\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right]}{b^2}+\frac{B\,\text{Hypergeometric2F1}\left[\frac{1}{2},1-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right]}{b}+\left(3\,a^2\,A\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right](1+\text{Tan}[e+f x]^2)^{\frac{1+m}{2}}\right)\Big/\left(b\left(-3\,(a^2-b^2)\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.\right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1-m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] - \left(a^2-b^2\right)(1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1-m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\Big)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big) - \left(3 a^3 \left(a^2-b^2\right) B \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1-m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right] \left(1+\text{Tan}[e+f x]^2\right)^{\frac{1+m}{2}}\right) \Big/$$

$$\Big(b^2 \Big(-3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1-m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \Big(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1-m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] - \left(a^2-b^2\right)(1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1-m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\Big) \text{Tan}[e+f x]^2\Big)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big) + \left(3 a A \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] \left(1+\text{Tan}[e+f x]^2\right)^{m/2}\right) \Big/$$

$$\Big(\Big(3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \Big(\left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2}, 1-\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] - 2 a^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\Big) \text{Tan}[e+f x]^2\Big)$$

$$\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big) - \left(3 a^2 \left(a^2-b^2\right) B \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right] \left(1+\text{Tan}[e+f x]^2\right)^{m/2}\right) \Big/$$

$$\Big(b \Big(3 \left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] + \Big(\left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2}, 1-\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right] - 2 a^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\Big)$$

$$\text{Tan}[e+f x]^2\Big) \left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big)\Big)\Big)\Big) \Big/$$

$$\Big(f \Big(\text{Sec}[e+f x]^2 \Big(\frac{A \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{2}-\frac{m}{2}, \frac{3}{2}, -\text{Tan}[e+f x]^2\right]}{b} - \frac{a B \text{Hypergeometric2F1}\left[\frac{1}{2}, \frac{1}{2}-\frac{m}{2}, \frac{3}{2}, -\text{Tan}[e+f x]^2\right]}{b^2} +$$

$$\frac{B\,\text{Hypergeometric2F1}\left[\frac{1}{2},1-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right]}{b}+\left(3 a^2 A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1+m}{2}}\right)\Big/$$

$$\left(b\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1-m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]-\left(a^2-b^2\right)(1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1-m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\right)-\left(3 a^3\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1+m}{2}}\right)\Big/$$

$$\left(b^2\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}(-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(2 a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}(-1-m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]-\left(a^2-b^2\right)(1+m)\,\text{AppellF1}\left[\frac{3}{2},\frac{1-m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\right)+\left(3 a A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\left(1+\text{Tan}[e+f x]^2\right)^{m/2}\right)\Big/$$

$$\left(\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]-2 a^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\right)-\left(3 a^2\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]\left(1+\text{Tan}[e+f x]^2\right)^{m/2}\right)\Big/$$

$$\left(b\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\left(\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]-2 a^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\right.$$

$$\left.\left.\text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\right)\right)+\text{Tan}[e+f x]$$

$$\left(-\left(\left(6 a^4 A\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1-m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right]\right.\right.\right.$$

$$\left.\text{Sec}[e+f x]^2 \text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1+m}{2}}\right) \Big/$$

$$\left(b\left(-3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1-m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1-m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]-\right.$$

$$\left(a^2-b^2\right)(1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1-m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2,\right.$$

$$\left.\left.\left.\left.-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\right)\right)+$$

$$\left(6 a^5\left(a^2-b^2\right) B \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1-m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\text{Sec}[e+f x]^2 \text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1+m}{2}}\right) \Big/$$

$$\left(b^2\left(-3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, \frac{1}{2}(-1-m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2 a^2 \text{AppellF1}\left[\frac{3}{2}, \frac{1}{2}(-1-m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]-\right.$$

$$\left.\left(a^2-b^2\right)(1+m) \text{AppellF1}\left[\frac{3}{2}, \frac{1-m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[e+f x]^2\right)\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\right)-$$

$$\left(6 a^3 A\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right.$$

$$\left.\text{Sec}[e+f x]^2 \text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{m/2}\right) \Big/$$

$$\left(\left(3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(\left(a^2-b^2\right) m \text{AppellF1}\left[\frac{3}{2}, 1-\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]-\right.$$

$$\left.\left.2 a^2 \text{AppellF1}\left[\frac{3}{2}, -\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\right)$$

$$\left.\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)^2\right)+\left(6 a^4\left(a^2-b^2\right) B \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2},\right.\right.$$

$$\left.\left.-\text{Tan}[e+f x]^2, \frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\left(1+\text{Tan}[e+f x]^2\right)^{m/2}\right) \Big/$$

$$\left(b\left(3\left(a^2-b^2\right) \text{AppellF1}\left[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(\left(a^2-b^2\right) m \,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]-\right.$$
$$\left.2 a^2 \,\text{AppellF1}\left[\frac{3}{2},-\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\right) \text{Tan}[e+f x]^2\Bigg)$$
$$\left(-b^2+a^2 \left(1+\text{Tan}[e+f x]^2\right)\right)^2\Bigg)+\Bigg(3 a^2 A \left(a^2-b^2\right) \Bigg(-\frac{1}{3} (-1-m) \,\text{AppellF1}\Big[\frac{3}{2},$$
$$1+\frac{1}{2} (-1-m),1,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]+$$
$$\frac{1}{3 \left(-a^2+b^2\right)}2 a^2 \,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2} (-1-m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right]$$
$$\text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Bigg) \left(1+\text{Tan}[e+f x]^2\right)^{\frac{1+m}{2}}\Bigg)\Bigg/$$
$$\Bigg(b \Bigg(-3 \left(a^2-b^2\right) \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2} (-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$
$$\Bigg(2 a^2 \,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2} (-1-m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]-$$
$$\left(a^2-b^2\right) (1+m) \,\text{AppellF1}\left[\frac{3}{2},\frac{1-m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)$$
$$\text{Tan}[e+f x]^2\Bigg) \left(-b^2+a^2 \left(1+\text{Tan}[e+f x]^2\right)\right)\Bigg)-$$
$$\Bigg(3 a^3 \left(a^2-b^2\right) B \Bigg(-\frac{1}{3} (-1-m) \,\text{AppellF1}\Big[\frac{3}{2},1+\frac{1}{2} (-1-m),1,\frac{5}{2},-\text{Tan}[e+f x]^2,$$
$$\frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]+\frac{1}{3 \left(-a^2+b^2\right)}$$
$$2 a^2 \,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2} (-1-m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right]$$
$$\text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Bigg) \left(1+\text{Tan}[e+f x]^2\right)^{\frac{1+m}{2}}\Bigg)\Bigg/$$
$$\Bigg(b^2 \Bigg(-3 \left(a^2-b^2\right) \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2} (-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$
$$\Bigg(2 a^2 \,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2} (-1-m),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]-$$
$$\left(a^2-b^2\right) (1+m) \,\text{AppellF1}\left[\frac{3}{2},\frac{1-m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]\Bigg)$$
$$\text{Tan}[e+f x]^2\Bigg) \left(-b^2+a^2 \left(1+\text{Tan}[e+f x]^2\right)\right)\Bigg)+$$
$$\Bigg(3 a^2 A \left(a^2-b^2\right) (1+m) \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2} (-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2 \text{Tan}[e+f x]^2}{-a^2+b^2}\right]$$
$$\text{Sec}[e+f x]^2 \text{Tan}[e+f x] \left(1+\text{Tan}[e+f x]^2\right)^{-1+\frac{1+m}{2}}\Bigg)\Bigg/$$
$$\Bigg(b \Bigg(-3 \left(a^2-b^2\right) \,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2} (-1-m),1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\right]+$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,(-1-m),\,2,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]-\right.$$

$$\left.\left(a^2-b^2\right)\,(1+m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1-m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[e+f\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)-$$

$$\left(3\,a^3\,\left(a^2-b^2\right)\,B\,(1+m)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,(-1-m),\,1,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,\frac{a^2\,\text{Tan}[e+f\,x]^2}{-a^2+b^2}\right]\right.$$

$$\left.\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\,\left(1+\text{Tan}[e+f\,x]^2\right)^{-1+\frac{1+m}{2}}\right)\Big/$$

$$\left(b^2\,\left(-3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,\frac{1}{2}\,(-1-m),\,1,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1}{2}\,(-1-m),\,2,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]-\right.$$

$$\left.\left(a^2-b^2\right)\,(1+m)\,\text{AppellF1}\left[\frac{3}{2},\,\frac{1-m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[e+f\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)+$$

$$\left(3\,a\,A\,\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right.$$

$$\left.\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\,\left(1+\text{Tan}[e+f\,x]^2\right)^{-1+\frac{m}{2}}\right)\Big/$$

$$\left(\left(3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,1-\frac{m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]-\right.$$

$$\left.\left.2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,-\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\,\text{Tan}[e+f\,x]^2\right)$$

$$\left.\left(-b^2+a^2\,\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)-\left(3\,a^2\,\left(a^2-b^2\right)\,B\,m\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{m}{2},\,1,\,\frac{3}{2},\right.\right.$$

$$\left.\left.-\text{Tan}[e+f\,x]^2,\,\frac{a^2\,\text{Tan}[e+f\,x]^2}{-a^2+b^2}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\,\left(1+\text{Tan}[e+f\,x]^2\right)^{-1+\frac{m}{2}}\right)\Big/$$

$$\left(b\,\left(3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,1-\frac{m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]-\right.$$

$$\left.2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,-\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)$$

$$\left.\left.\text{Tan}[e+f\,x]^2\right)\,\left(-b^2+a^2\,\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)+$$

$$\left(3\,a\,A\,\left(a^2-b^2\right)\,\left(\frac{1}{3}\,m\,\text{AppellF1}\left[\frac{3}{2},\,1-\frac{m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right.\right.$$

$$\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]-\frac{1}{3\left(a^2-b^2\right)}2\,a^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\right.$$

$$\left.\left.\left.-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\left(1+\text{Tan}[e+f x]^2\right)^{m/2}\right)\Big/$$

$$\left(\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]-\right.$$

$$\left.\left.2\,a^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)$$

$$\left.\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\right)-\left(3\,a^2\left(a^2-b^2\right)B\left(\frac{1}{3}m\,\text{AppellF1}\left[\frac{3}{2},1-\right.\right.\right.$$

$$\left.\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]+$$

$$\frac{1}{3\left(-a^2+b^2\right)}2\,a^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]$$

$$\left.\left.\text{Sec}[e+f x]^2\,\text{Tan}[e+f x]\right)\left(1+\text{Tan}[e+f x]^2\right)^{m/2}\right)\Big/$$

$$\left(b\left(3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},-\frac{m}{2},1,\frac{3}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(\left(a^2-b^2\right)m\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]-\right.$$

$$\left.\left.2\,a^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\right)$$

$$\left.\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\right)+\frac{1}{b}B\,\text{Csc}[e+f x]\,\text{Sec}[e+f x]$$

$$\left(-\text{Hypergeometric2F1}\left[\frac{1}{2},1-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right]+\left(1+\text{Tan}[e+f x]^2\right)^{-1+\frac{m}{2}}\right)+$$

$$\frac{1}{b}A\,\text{Csc}[e+f x]\,\text{Sec}[e+f x]\left(-\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right]+\right.$$

$$\left.\left(1+\text{Tan}[e+f x]^2\right)^{-\frac{1}{2}+\frac{m}{2}}\right)-\frac{1}{b^2}a\,B\,\text{Csc}[e+f x]\,\text{Sec}[e+f x]$$

$$\left(-\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{1}{2}-\frac{m}{2},\frac{3}{2},-\text{Tan}[e+f x]^2\right]+\left(1+\text{Tan}[e+f x]^2\right)^{-\frac{1}{2}+\frac{m}{2}}\right)-$$

$$\left(3\,a^2\,A\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1-m\right),1,\frac{3}{2},-\text{Tan}[e+f x]^2,\frac{a^2\,\text{Tan}[e+f x]^2}{-a^2+b^2}\right]\right.$$

$$\left(1+\text{Tan}[e+f x]^2\right)^{\frac{1+m}{2}}$$

$$\left(2\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1-m\right),2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]-\right.\right.$$

$$\left.\left(a^2-b^2\right)\left(1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1-m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)$$

$$\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]-3\left(a^2-b^2\right)\left(-\frac{1}{3}\left(-1-m\right)\text{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}\left(-1-m\right),1,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]-\frac{1}{3\left(a^2-b^2\right)}2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1-m\right),2,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]\right)+\text{Tan}[e+fx]^2\left(2\,a^2\left(-\frac{3}{5}\left(-1-m\right)\text{AppellF1}\left[\frac{5}{2},1+\frac{1}{2}\left(-1-m\right),2,\frac{7}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]-\frac{1}{5\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1}{2}\left(-1-m\right),3,\frac{7}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]\right)-\left(a^2-b^2\right)\left(1+m\right)\left(-\frac{3}{5}\left(1-m\right)\text{AppellF1}\left[\frac{5}{2},1+\frac{1-m}{2},1,\frac{7}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]-\frac{1}{5\left(a^2-b^2\right)}6\,a^2\,\text{AppellF1}\left[\frac{5}{2},\frac{1-m}{2},2,\frac{7}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]\right)\right)\right)\right)\Big/$$

$$\left(b\left(-3\left(a^2-b^2\right)\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1-m\right),1,\frac{3}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]+\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1-m\right),2,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]-\left(a^2-b^2\right)\left(1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1-m}{2},1,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\right)\text{Tan}[e+fx]^2\right)^2\left(-b^2+a^2\left(1+\text{Tan}[e+fx]^2\right)\right)\right)+$$

$$\left(3\,a^3\left(a^2-b^2\right)B\,\text{AppellF1}\left[\frac{1}{2},\frac{1}{2}\left(-1-m\right),1,\frac{3}{2},-\text{Tan}[e+fx]^2,\frac{a^2\,\text{Tan}[e+fx]^2}{-a^2+b^2}\right]\left(1+\text{Tan}[e+fx]^2\right)^{\frac{1+m}{2}}\left(2\left(2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1-m\right),2,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]-\left(a^2-b^2\right)\left(1+m\right)\text{AppellF1}\left[\frac{3}{2},\frac{1-m}{2},1,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\right)\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]-3\left(a^2-b^2\right)\left(-\frac{1}{3}\left(-1-m\right)\text{AppellF1}\left[\frac{3}{2},1+\frac{1}{2}\left(-1-m\right),1,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\text{Sec}[e+fx]^2\,\text{Tan}[e+fx]-\frac{1}{3\left(a^2-b^2\right)}2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\frac{1}{2}\left(-1-m\right),2,\frac{5}{2},-\text{Tan}[e+fx]^2,-\frac{a^2\,\text{Tan}[e+fx]^2}{a^2-b^2}\right]\right.\right.\right.$$

$$\text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Big) + \text{Tan}[e+f x]^2 \Big(2 a^2 \Big(-\frac{3}{5} (-1-m) \text{AppellF1}\Big[\frac{5}{2},$$

$$1+\frac{1}{2}(-1-m), 2, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[$$

$$e+f x] - \frac{1}{5(a^2-b^2)} 12 a^2 \text{AppellF1}\Big[\frac{5}{2}, \frac{1}{2}(-1-m), 3, \frac{7}{2}, -\text{Tan}[e+f x]^2,$$

$$-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Big) - (a^2-b^2)(1+m)$$

$$\Big(-\frac{3}{5}(1-m) \text{AppellF1}\Big[\frac{5}{2}, 1+\frac{1-m}{2}, 1, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]$$

$$\text{Sec}[e+f x]^2 \text{Tan}[e+f x] - \frac{1}{5(a^2-b^2)} 6 a^2 \text{AppellF1}\Big[\frac{5}{2}, \frac{1-m}{2}, 2, \frac{7}{2},$$

$$-\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Big)\Big)\Big)\Big)\Big) \Big/$$

$$\Big(b^2 \Big(-3(a^2-b^2) \text{AppellF1}\Big[\frac{1}{2}, \frac{1}{2}(-1-m), 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] +$$

$$\Big(2 a^2 \text{AppellF1}\Big[\frac{3}{2}, \frac{1}{2}(-1-m), 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] -$$

$$(a^2-b^2)(1+m) \text{AppellF1}\Big[\frac{3}{2}, \frac{1-m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2,$$

$$-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]\Big) \text{Tan}[e+f x]^2\Big)^2 \Big(-b^2+a^2 (1+\text{Tan}[e+f x]^2)\Big)\Big) -$$

$$\Big(3 a A (a^2-b^2) \text{AppellF1}\Big[\frac{1}{2}, -\frac{m}{2}, 1, \frac{3}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]$$

$$(1+\text{Tan}[e+f x]^2)^{m/2}$$

$$\Big(2 \Big((a^2-b^2) m \text{AppellF1}\Big[\frac{3}{2}, 1-\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] -$$

$$2 a^2 \text{AppellF1}\Big[\frac{3}{2}, -\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big]\Big) \text{Sec}[e+f x]^2$$

$$\text{Tan}[e+f x] + 3(a^2-b^2) \Big(\frac{1}{3} m \text{AppellF1}\Big[\frac{3}{2}, 1-\frac{m}{2}, 1, \frac{5}{2}, -\text{Tan}[e+f x]^2,$$

$$-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[e+f x] - \frac{1}{3(a^2-b^2)} 2 a^2 \text{AppellF1}\Big[\frac{3}{2},$$

$$-\frac{m}{2}, 2, \frac{5}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Big) +$$

$$\text{Tan}[e+f x]^2 \Big((a^2-b^2) m \Big(-\frac{1}{5(a^2-b^2)} 6 a^2 \text{AppellF1}\Big[\frac{5}{2}, 1-\frac{m}{2}, 2, \frac{7}{2}, -\text{Tan}[e+f x]^2,$$

$$-\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[e+f x] - \frac{6}{5}\Big(1-\frac{m}{2}\Big) \text{AppellF1}\Big[\frac{5}{2}, 2-$$

$$\frac{m}{2}, 1, \frac{7}{2}, -\text{Tan}[e+f x]^2, -\frac{a^2 \text{Tan}[e+f x]^2}{a^2-b^2}\Big] \text{Sec}[e+f x]^2 \text{Tan}[e+f x]\Big) -$$

$$2\,a^2\,\left(\frac{3}{5}\,m\,\text{AppellF1}\left[\frac{5}{2},\,1-\frac{m}{2},\,2,\,\frac{7}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right.$$

$$\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\frac{1}{5\,\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,-\frac{m}{2},\,3,\,\frac{7}{2},\right.$$

$$\left.\left.\left.\left.\left.-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\right)\Big/$$

$$\left(\left(3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,1-\frac{m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]-2\,a^2\right.$$

$$\left.\left.\text{AppellF1}\left[\frac{3}{2},\,-\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\,\text{Tan}[e+f\,x]^2\right)^2$$

$$\left.\left(-b^2+a^2\,\left(1+\text{Tan}[e+f\,x]^2\right)\right)\right)+\left(3\,a^2\,\left(a^2-b^2\right)\,B\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{m}{2},\,1,\right.\right.$$

$$\left.\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,\frac{a^2\,\text{Tan}[e+f\,x]^2}{-a^2+b^2}\right]\,\left(1+\text{Tan}[e+f\,x]^2\right)^{m/2}$$

$$\left(2\,\left(\left(a^2-b^2\right)\,m\,\text{AppellF1}\left[\frac{3}{2},\,1-\frac{m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]-\right.\right.$$

$$\left.2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\,-\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right)\,\text{Sec}[e+f\,x]^2$$

$$\text{Tan}[e+f\,x]+3\,\left(a^2-b^2\right)\,\left(\frac{1}{3}\,m\,\text{AppellF1}\left[\frac{3}{2},\,1-\frac{m}{2},\,1,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\right.\right.$$

$$\left.-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\frac{1}{3\,\left(a^2-b^2\right)}2\,a^2\,\text{AppellF1}\left[\frac{3}{2},\right.$$

$$\left.\left.-\frac{m}{2},\,2,\,\frac{5}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)+$$

$$\text{Tan}[e+f\,x]^2\,\left(\left(a^2-b^2\right)\,m\,\left(-\frac{1}{5\,\left(a^2-b^2\right)}6\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,1-\frac{m}{2},\,2,\,\frac{7}{2},\,-\text{Tan}[e+f\,x]^2,\right.\right.\right.$$

$$\left.-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\frac{6}{5}\,\left(1-\frac{m}{2}\right)\,\text{AppellF1}\left[\frac{5}{2},\,2-\right.$$

$$\left.\left.\frac{m}{2},\,1,\,\frac{7}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)-$$

$$2\,a^2\,\left(\frac{3}{5}\,m\,\text{AppellF1}\left[\frac{5}{2},\,1-\frac{m}{2},\,2,\,\frac{7}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\right.$$

$$\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]-\frac{1}{5\,\left(a^2-b^2\right)}12\,a^2\,\text{AppellF1}\left[\frac{5}{2},\,-\frac{m}{2},\,3,\,\frac{7}{2},\right.$$

$$\left.\left.\left.\left.\left.-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]\,\text{Sec}[e+f\,x]^2\,\text{Tan}[e+f\,x]\right)\right)\right)\right)\right)\Big/$$

$$\left(b\,\left(3\,\left(a^2-b^2\right)\,\text{AppellF1}\left[\frac{1}{2},\,-\frac{m}{2},\,1,\,\frac{3}{2},\,-\text{Tan}[e+f\,x]^2,\,-\frac{a^2\,\text{Tan}[e+f\,x]^2}{a^2-b^2}\right]+\right.\right.$$

$$\left(\left(a^2-b^2\right) m\,\text{AppellF1}\left[\frac{3}{2},1-\frac{m}{2},1,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]-2 a^2\,\text{AppellF1}\left[\frac{3}{2},-\frac{m}{2},2,\frac{5}{2},-\text{Tan}[e+f x]^2,-\frac{a^2\,\text{Tan}[e+f x]^2}{a^2-b^2}\right]\right)\text{Tan}[e+f x]^2\Big)^2\left(-b^2+a^2\left(1+\text{Tan}[e+f x]^2\right)\right)\Big)\Big)\Big)\Big)$$

Problem 641: Attempted integration timed out after 120 seconds.

$$\int (a+b\,\text{Cos}[e+f x])^{3/2}\,(A+B\,\text{Cos}[e+f x])\,(c\,\text{Sec}[e+f x])^m\,dx$$

Optimal (type 8, 210 leaves, 2 steps):

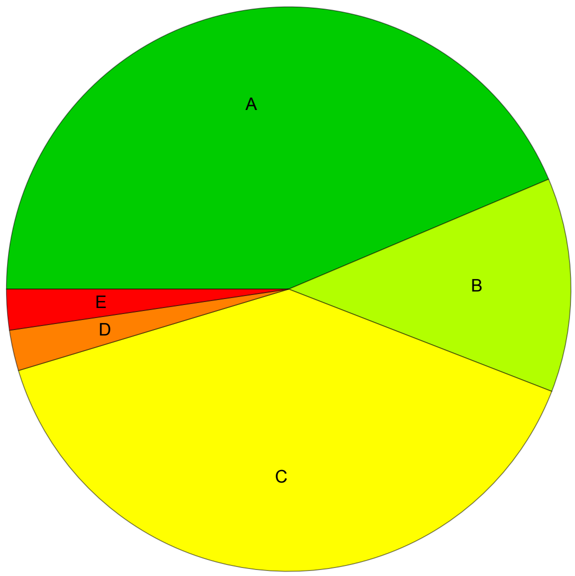
$$\frac{2 b B\,\text{Cos}[e+f x]\,\sqrt{a+b\,\text{Cos}[e+f x]}\,(c\,\text{Sec}[e+f x])^m\,\text{Sin}[e+f x]}{f\,(5-2 m)}+\frac{1}{c\,(5-2 m)}2\,(c\,\text{Cos}[e+f x])^m\,(c\,\text{Sec}[e+f x])^m\,\text{Int}\Big[\Big((c\,\text{Cos}[e+f x])^{-m}\left(\frac{1}{2} a c\left(2 b B\,(1-m)+2 a A\left(\frac{5}{2}-m\right)\right)+\frac{1}{2} c\left(b^2 B\,(3-2 m)+a\,(2 A b+a B)\,(5-2 m)\right)\text{Cos}[e+f x]+\frac{1}{2} b c\,(A b\,(5-2 m)+2 a B\,(3-m))\,\text{Cos}[e+f x]^2\right)\Big)\Big/\left(\sqrt{a+b\,\text{Cos}[e+f x]}\right),x\Big]$$

Result (type 1, 1 leaves):

???

Summary of Integration Test Results

644 integration problems



A - 281 optimal antiderivatives

B - 79 more than twice size of optimal antiderivatives

C - 254 unnecessarily complex antiderivatives

D - 15 unable to integrate problems

E - 15 integration timeouts